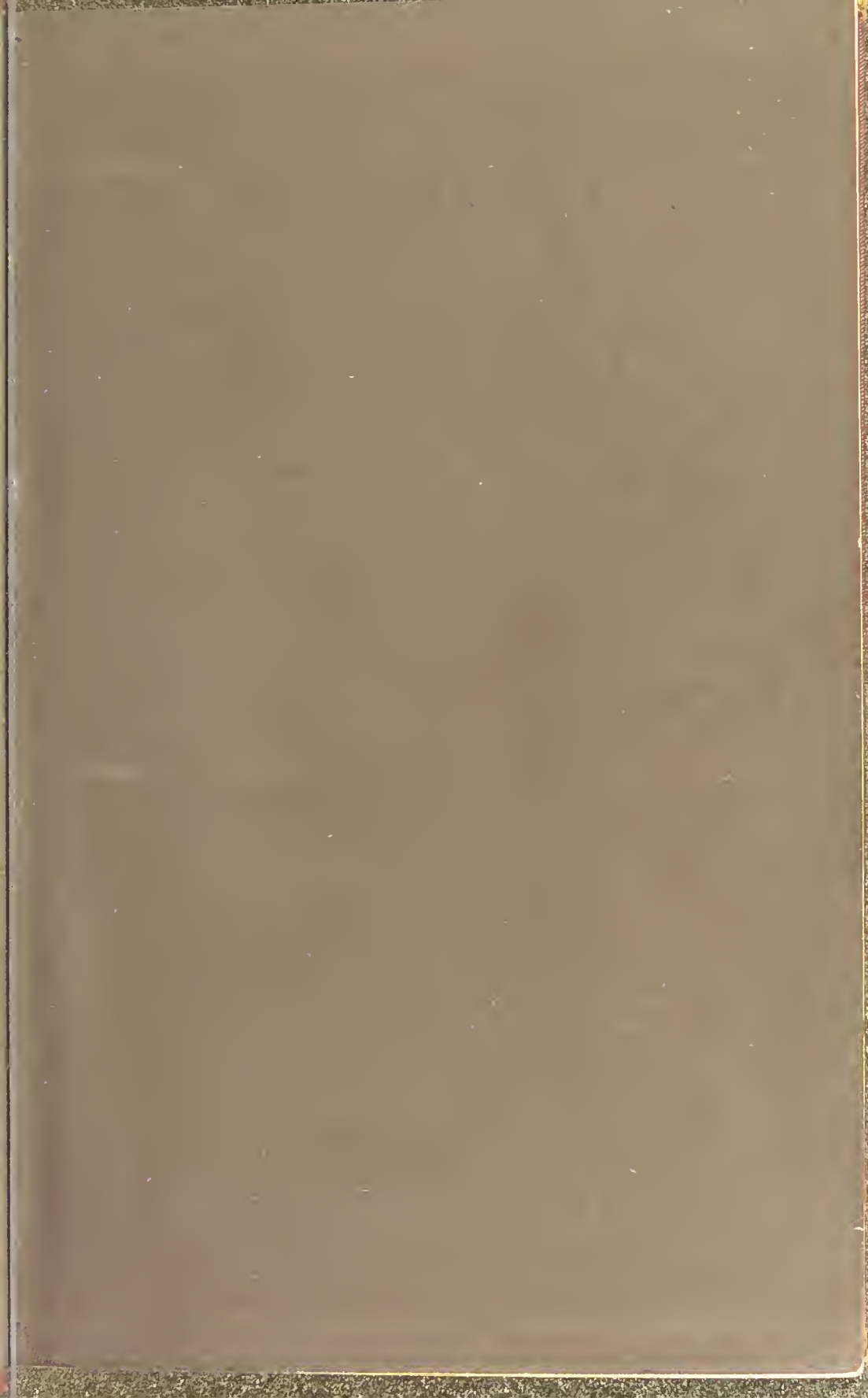


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A SHORT PRACTICE OF MIDWIFERY

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A SHORT PRACTICE OF MIDWIFERY,

EMBODYING THE TREATMENT ADOPTED IN
THE ROTUNDA HOSPITAL, DUBLIN.

BY

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WITH A PREFACE BY

W. J. SMYLY, M.D., F.R.C.P.I.,
LATE MASTER OF THE ROTUNDA HOSPITAL.

SECOND EDITION.

*With 57 Illustrations, and an Appendix containing the statistics
of the Hospital for the last nine years*



LONDON

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PREFACE.

I AM sure that Dr Jellett's little book will prove acceptable to many practitioners and students who desire a succinct account of the methods adopted in the Rotunda Hospital, in the management of parturient women. In many particulars the views expressed are at variance with the rules laid down in most text-books, and I may here emphasise a few of these. It has been shown, that, whereas in hospitals the introduction of antiseptics has been followed by most gratifying results, in private practice little if any improvement is observable. To account for this deplorable state of affairs, it has been pointed out that proper precautions are not so universally adopted by practitioners and nurses as they should be ; and, also, on the other hand, that too much reliance upon antiseptic methods has encouraged "meddlesome midwifery ;" so that what has been gained by the former has been sacrificed by the latter. The recommendations in this work regarding the substi-

tution, as far as possible, of external for internal manipulations; the avoidance of routine douching, of the use of the plug in abortions and placenta prævia, and of the forceps in cases where the head has not passed the pelvic brim; and the management of the third stage of labour, are matters of the greatest importance. I am entirely in accord with the statement that a practitioner can appraise his own merits by the infrequency of post-partum hæmorrhage in his practice.

The subjects, which will probably provoke most criticism, are the methods of treatment recommended in accidental hæmorrhage and eclampsia. In the first two years of my Mastership, I treated all serious cases of accidental hæmorrhage by rupturing the membranes; and, if that did not prove effectual, delivery was effected by version and extraction or perforation. The results were so bad that I resorted to plugging in all cases of external accidental hæmorrhage in which the membranes were intact, and labour pains absent or feeble—that is in the great majority of cases—and with excellent results. The fear that an external would be converted into an internal hæmorrhage proved groundless. The use of chloroform in puerperal eclampsia I abandoned with the greatest reluctance. Nothing is more gratifying to the practitioner himself and the relatives of the patient than the complete control of the convul-

sions by chloroform, but it does not save the patient's life ; on the contrary, it increases the tendency to death.

Even to those who differ from the views advanced, this little work will afford matter for reflection, especially as the results of the treatment advocated can be judged from the statistics appended.

W. J. SMYLY, M.D., F.R.C.P.I.,

Ex-Master of the Rotunda Hospital, Dublin.



AUTHOR'S PREFACE TO THE FIRST EDITION.

THE following short Practice of Midwifery has been written with the object of giving a concise and practical description of the treatment, which has been so successfully carried out in this Hospital, under the mastership of Dr W. J. Smyly; and which is still followed by his successor, Dr R. D. Purefoy. I feel that it is necessary to offer an excuse, for the publication of another handbook of midwifery, when so very many are in existence. My excuse is twofold. I have written this little work, first, because I was requested to do so by several of the students attending the Hospital; secondly, because the extremely successful results, following the treatment adopted here, seem to warrant its publication. I have given, in the form of an appendix, statistics of the various cases treated in the Hospital, during the mastership of Dr W. J. Smyly. It will be seen, from them, what

a striking improvement has occurred in the rate of maternal mortality. Necessarily, in the space of seven years, considerable changes have been made in the various methods of treatment. The treatment, which I describe, is that which has been selected in accordance with the experience of these years; and which, during the last year, has yielded the extremely low maternal mortality of 0.06 per cent.

I should like to say a few words in apology for the shortcomings of the chapter on Anatomy. When I commenced this book, I determined to omit any such chapter, as there are so many excellent descriptions of pelvic anatomy in the various textbooks of midwifery. As far as students and practitioners are concerned, I have adhered to that determination. The short chapter on pelvic anatomy is not intended for them. It is solely meant for the nurses of this Hospital, who may read the book for their examinations; and to whom, I believe, such a chapter will be useful.

I wish here to express my deep sense of the kindness of Dr Smyly, in permitting me to publish his teaching in this form. I trust, that the extreme clearness and science of his teaching will not be so obscured by my shortcomings, as to render it less obvious to those who read it in this book, than it has been to those who have heard it from himself.

Further, I wish to express my thanks to the several gentlemen who have assisted me ; to Dr Carton, who has devoted so much time and trouble to the illustrations ; to Dr Drury and Mr Bresland, who have corrected the proof sheets ; and to Dr Purefoy, who has permitted me to associate the book with the Rotunda Hospital. Lastly, I must express my indebtedness to the works of Winckel, Lusk, and Dührssen, from all of which I have derived great assistance. Many of the illustrations are new, and such are the work of Dr Carton. The remainder are either directly copied from other works, or slightly modified in the copying. All such illustrations are acknowledged in the text beneath them ; for the majority of them, I am indebted to the "Norris Text-book of Obstetrics."

HENRY JELLETT.

ROTUNDA HOSPITAL, DUBLIN ;

March, 1897.



PREFACE TO THE SECOND EDITION.

THE order in which the various subjects are treated in this edition varies somewhat from the order adopted in the first edition. After the initial introductory chapters come the diagnosis, phenomena, and treatment of pregnancy and normal labour, and of the various presentations. Next come the chapters devoted to the pathology of pregnancy, then those on operative midwifery, and lastly the chapters on infant feeding and infantile diseases. The author hopes that his expectation that this arrangement will be preferred to the former will prove to be correct.

Twelve new illustrations have been added, chiefly in the chapter on contracted pelvis, and about sixty pages of additional matter. These last will be found principally in the chapters on "The Phenomena of Labour," "The Diagnosis of the Presentation of the Fœtus," "The Management of Labour," "Diseases of Pregnancy, and of the Decidua and Ovum," "Ante- and Post-partum Hæmorrhages," "Contracted Pelvis," "Eclampsia." Also the Report of

the Rotunda Hospital for the past two years has been added, thus laying before the reader the statistics of 11,958 cases of labour. As well as making these additions, the author has done his utmost to correct various errors which had been allowed to find their way into the first edition.

The author wishes to return his sincere thanks to Dr. A. V. Macan, former Master of the Rotunda Hospital, for the extreme kindness with which he has devoted much time to the correcting of the text of the former edition and of the proof sheets of this edition. The large majority of the improvements in the book are due to his advice and assistance. The author also wishes to thank Dr. Carton for several new drawings, Dr. Drury for reading the proof sheets, Dr. R. D. Purefoy for permission to publish the Reports of the Rotunda Hospital for the last two years, and the Medical Supply Association for providing wood blocks of instruments. In conclusion the author hopes that this edition may merit and obtain the same kind approval with which its predecessor was received.

HENRY JELLETT.

61, LOWER MOUNT STREET,
MERRION SQUARE, DUBLIN;
March, 1899.

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A SHORT PRACTICE OF MIDWIFERY.

CHAPTER I.

ASEPSIS IN MIDWIFERY.

Importance of Asepsis in Midwifery—Mechanism by which the Uterus is kept Aseptic during Pregnancy and Labour—The Vaginal Secretion—The Operculum—Method of sterilising the Hands and the Instruments—Prophylactic Douching—Douching Solutions—Preparation of Patient for an Obstetrical Operation.

It is not an exaggeration to say that the most essential knowledge in midwifery is the knowledge of asepsis. A practitioner who knows nothing of the science and art of midwifery, except that it is absolutely necessary that his hands and instruments are sterile, will save more lives than the most accomplished obstetrician who does not practise asepsis. It is therefore most fitting that the first chapter of this little book should deal with the practice of asepsis in midwifery.

If there were no such things as vaginal examinations, or as intra-vaginal or intra-uterine operations, a previously healthy patient confined under proper hygienic circumstances would never suffer from acute sepsis. This being so, there must be some natural mechanism, which guards against the

entrance of pathological organisms into the uterus. At the commencement of labour, a healthy vagina is lubricated with a fluid, which is composed partly of the secretion of the cervical glands, and partly of serous transudation from the vaginal blood-vessels. This fluid is swarming with bacilli, which not only are not pathological, but are a direct bar to the entrance of pathological bacteria (Döderlein). This end they bring about by the generation of lactic acid, which renders the vaginal discharge acid, and so prevents the development of pyogenic organisms, as the latter can only exist in an alkaline medium. It has been found by experiment, that pyogenic organisms introduced into the vagina are destroyed in a few hours. In addition to the protection furnished by the vaginal discharge, there is a still further bar to the entrance of bacteria into the uterus; this is the plug of mucus which fills the cervix, the so-called *operculum*. This plug is described as consisting of three layers,—an upper or uterine layer, a middle or cervical layer, and a lower or vaginal layer. The upper layer contains no bacteria of any kind, hence it is aseptic. The middle layer contains dead bacteria and quantities of white corpuscles. These latter act as phagocytes, and hence the middle layer is antiseptic. The lower layer contains swarms of bacteria,—non-pathogenic if the vagina is healthy, and pathogenic if there is any form of vaginitis present; it therefore may be septic. It is said that no bacteria can find their way past the middle layer of the operculum, except gonococci. Thus, by the aid of the vaginal bacilli and of the operculum, the uterus is kept aseptic before delivery.

After the birth of the child all bacteria have disappeared from the vagina. This is brought about in the following manner:—When the membranes rupture, the flow of liquor amnii through the vagina, washes the greater quantity of micro-organisms out of it. Then the presenting part of the child, as it passes through the vagina, distends its walls to the utmost, so that the second rush of liquor amnii, and after it the placenta, are enabled to wash away all that remain. Thus the uterus is prevented from becoming infected after delivery, the time at which it is exposed to the greatest risks.

Inasmuch as vaginal examinations and operations must be performed, it is incumbent on us to do everything in our power to avoid the introduction of bacteria. They may be introduced in three ways:—

- (1) By septic hands.
- (2) By septic instruments.
- (3) By carrying up septic matter from the vulva or vagina on our fingers or instruments into the uterus.

(1) To avoid the first the hands must be cleansed thoroughly. The following method has stood the test of time in the Rotunda Hospital, and appears to be sufficient:—First scrub the hands thoroughly for at least three minutes in soap and water with a strong nail-brush, paying particular attention to the nails and the skin round them. Then rinse the hands in plain water to remove all trace of soap, which decomposes corrosive sublimate. Lastly, soak the hands for one minute in a 1 in 500 solution of corrosive sublimate. Avoid the use of lubricants if possible. If one must be used, let it be thoroughly

aseptic. Carbolised vaseline is never safe, particularly when kept in a box into which dirty fingers are introduced from time to time. Soap, which has been boiled in the making, furnishes an excellent and safe lubricant. It requires one precaution, viz. that the outer layer be first washed off, and thus any dirt which was in contact with it removed. The inner layer is perfectly aseptic.

(2) To avoid the second method of infection instruments must be, as far as possible, of metal, to enable them to be boiled. This should be done for at least five minutes. If a one per cent. solution of common washing soda is used, the instruments will not become rusty.

(3) To avoid the third method of introducing infection, the vulva should be thoroughly washed and disinfected by the nurse before any examination is made. If any operation has to be performed, which necessitates the introduction of fingers or of instruments into the uterus, the vagina must be disinfected as well. This is done, because, in many cases, the vaginal discharge is not normal; and also because bacteria, which may be non-pathogenic in the vagina, may become pathogenic by feeding upon dead tissue, blood-clots, &c., in the uterus. To disinfect the vagina it must be thoroughly douched with a solution of creolin, scrubbed all round with the fingers and a small piece of soap, and then douched again.

Now, as regards routine prophylactic douching, *i. e.* douching before and after labour with a view to preventing sepsis, a practice which is recommended by many. Before adopting a general principle of treatment which is obviously not dictated by

nature, it is well to ask certain questions. Is the particular practice which we are about to adopt necessary or unnecessary, free from danger or dangerous? If it is proved to be necessary in some cases, is it so in all cases? If it is not so in all cases can we formulate rules which will govern its use in the particular case in which it is required? Douching, like vaginal examinations, can never be wholly free from danger, hence its use must be entirely controlled by the necessity for it. Assuming the truth of Döderlein's investigations into the condition of the vagina during labour, routine ante- or post-partum douching is obviously not necessary in cases in which the genital tract is in a healthy condition, and in which no intra-uterine manipulations have to be performed. It is equally obvious that in cases of putrefaction or suppuration in or near any part of the genital tract, douching is advisable—always following the rule to avoid carrying infection from one part of the tract to another in our endeavour to remove it. Following this line of reasoning we find that ante-partum douching is indicated:—

- (1) If any operation is about to be performed.
- (2) If there is any purulent or putrid discharge from the vagina or the uterus.
- (3) If the patient is a very long time in the second stage. In these cases the liquor amnii drains away slowly, and, by the time the head is born, there is not sufficient left to wash out the vagina. Also, during the protracted labour, some of the liquor amnii may lie in the vagina and decompose.

Prophylactic post-partum douching is a practice which must be even more strongly condemned than

ante-partum douching. Inasmuch as it has been proved that the vagina is free from bacteria after delivery, it is quite unnecessary. In addition, when it is administered as a routine practice by an ignorant nurse, with a much-used Higginson's syringe, and at a time when the absorption of septic organisms is so easy, it is extremely dangerous. Like ante-partum douching it is indicated under certain conditions, and must then be regarded as a serious operation, and performed with the strictest attention to asepsis. If possible it should be administered by the medical attendant himself. The indications for its use are as follows :—

- (1) If the hand has been introduced into the uterus, *e. g.* for the removal of a placenta.
- (2) If there is post-partum hæmorrhage.
- (3) If the foetus or placenta is putrid.
- (4) If there is purulent discharge from the uterus.
- (5) If the lochia becomes putrid at any time during the puerperium.

For the purpose of douching a mixture of creolin and water, of a strength of half an ounce of the former to a gallon of the latter, is best. It should be used at a temperature of 100° F. in ordinary cases, but to check hæmorrhage it may be used up to 120° F. Corrosive sublimate is almost useless for the purpose of douching, and should never be used. Before labour it corrugates the tissues and makes them rigid, so that lacerations are very liable to occur. After delivery, if used too strong, or if any is left behind, it may cause symptoms of mercurial poisoning. Corrosive sublimate is, here, probably useless

as an antiseptic, as it decomposes quickly in the presence of albumen. Douches do not destroy bacteria in the vagina and uterus by means of the antiseptic in the douche, as the fluid does not remain in contact with them for a sufficient length of time. Bacteria are removed mechanically by the flow of fluid, whilst the antiseptic merely helps to render the water in the douche aseptic. Coal-tar derivatives, as creolin and carbolic acid, are said in addition to cause a leucocytosis, so increasing phagocytosis.

We should, therefore, commence every obstetrical operation, in which either hands or instruments have to be introduced into the uterus, in the following manner :—

- (1) Wash the external genitals and the skin round them thoroughly with soap and water.

- (2) Douche out the vagina thoroughly with creolin solution, then scrub its walls with the fingers and a clean piece of soap, and then douche it out again.

CHAPTER II.

ELEMENTARY PELVIC ANATOMY.

The Bony Pelvis—The Diameters of the Pelvis—The Inclined Planes—The Female Organs of Generation: the Ovaries, Fallopian Tubes, Uterus, Vagina—The Decidua—The Ovum—Table for estimating the Age of the Fœtus by its Length—The Fœtal Skull.

The Pelvis.—The bony pelvis is formed by four bones—the two innominate bones, the sacrum, and the coccyx. These articulate in the following manner:—Each innominate bone articulates with the sacrum at the sacro-iliac synchondrosis, and with its fellow at the pubis. The sacrum articulates with the last lumbar vertebra, with the two innominate bones at the sacro-iliac joint, and with the coccyx at the sacro-coccygeal joint. The coccyx articulates with the sacrum alone. The joints are usually rigid, but towards the end of pregnancy their ligaments soften, and so permit slight movements to take place. The sacrum moves antero-posteriorly, as if it was pivoted upon the sacro-iliac synchondroses. As the fœtal head descends, it presses upon the promontory of the sacrum and forces it slightly backwards. As soon as the head has passed the brim the promontory returns to its original position, and then moves slightly forwards, as the descended head drives the lower pieces of the sacrum backwards. The coccyx can also move backwards on the sacro-coccygeal joint, and thus increase the antero-posterior diameter

of the outlet by about three-quarters of an inch. The pubic bones can separate slightly at the symphysis.

The true pelvis possesses certain diameters which are of great importance. These are, the diameters of the brim and the diameters of the outlet. The brim has four chief diameters, and by their measurement we can ascertain its shape and size. They are :—

(1) *The antero-posterior diameter (conjugata vera)*, *i. e.* the distance between the promontory of the sacrum and the most prominent part of the inner surface of the symphysis pubis. It measures normally from 4 to $4\frac{1}{4}$ inches (10—10·5 cm.).

(2) *The transverse diameter*, *i. e.* the greatest distance between the lateral margins of the brim. It measures $5\frac{1}{4}$ inches (13 cm.).

(3 and 4) *Two oblique diameters*, right and left, *i. e.* the distance between either sacro-iliac synchondrosis and the pectineal eminence of the opposite side. The right oblique diameter runs from the right sacro-iliac synchondrosis to the left pectineal eminence ; the left oblique diameter runs from the left sacro-iliac synchondrosis to the right pectineal eminence. They each measure about 5 inches (12·5 cm.).

The outlet has two chief diameters :—

(1) *The antero-posterior diameter*, *i. e.* the distance from the tip of the coccyx to the lower border of the symphysis. It measures $3\frac{4}{5}$ inches (9·5 cm.), and can be increased by three-quarters of an inch by the backward movement of the coccyx.

(2) *The transverse*, *i. e.* the distance between the tuberosities of the ischii. It measures $4\frac{2}{5}$ inches (11 cm.)

It is also well to know the measurement of the

pelvic cavity, first, in its plane of greatest expansion, and, secondly, in its plane of greatest contraction. *The plane of greatest expansion* passes through the middle of the symphysis and the junction of the second and third pieces of the sacrum. *The plane of greatest contraction* passes through the lower margin of the symphysis and the lower margin of the last piece of the sacrum. For the sake of convenience I append a table of the diameters of the pelvis in these various planes:—

| | Antero-posterior Diameter. | Trans-verse. | Oblique. |
|-------------------------|----------------------------|-----------------------|----------|
| Plane of pelvic inlet . | 4— $4\frac{1}{4}$ inches | $5\frac{1}{4}$ inches | 5 inches |
| „ greatest expansion | $5\frac{1}{10}$ „ | 5 „ | |
| „ greatest contraction | $4\frac{3}{5}$ „ | $4\frac{1}{5}$ „ | |
| „ pelvic outlet | $3\frac{1}{5}$ „ | $4\frac{2}{5}$ „ | |

The inclined planes of the pelvis, which concern the obstetrician, are two in number. They start one at either side in front of the ischiatic spines, and slope downwards and forwards over the ischium. They are so placed that the part of the child, which first impinges on either of them, is directed downwards and forwards. They are an important factor in the causation of internal rotation.

There are other measurements of the pelvis which are of interest in some cases. I therefore append them:—

| | Inches. | Cm. |
|--|-------------------|--------|
| The distance between the anterior superior spines . | = 10 | (25) |
| „ „ iliac crests . . . | = $11\frac{2}{5}$ | (28·5) |
| The height of the posterior wall of the pelvis . | = $5\frac{1}{5}$ | (13) |
| „ anterior „ „ . | = $1\frac{3}{5}$ | (4) |
| The external conjugate, <i>i. e.</i> the distance between the depression below the last lumbar spine and the upper margin of the symphysis . . . | } = 8 (20) | |

The Female Organs of Generation.—The internal female organs of generation are as follows :—

I. *The Ovaries.*—The ovaries lie, one at each side of the uterus, attached to the posterior aspect of the broad ligament. They measure $1\frac{1}{2}$ inches in length, $\frac{4}{5}$ inch in width, and about $\frac{1}{5}$ inch in thickness. They are uncovered by peritoneum. Their blood-supply is received through the ovarian artery, a branch of the abdominal aorta, and is returned through the ovarian veins. These latter ramify in the broad ligament to form the pampiniform plexus, and then flow, on the right side, into the inferior vena cava; on the left side, into the renal vein. The nerve-supply of the ovaries is derived from the third and fourth sacral nerves, and from the hypogastric and ovarian sympathetic plexuses. The lymphatics from the ovaries end in the retro-peritoneal glands, in front of the aorta.

II. *The Fallopian Tubes, or Oviducts.*—The Fallopian tubes extend from either uterine cornu outwards between the layers, and at the upper fold of the broad ligament. They measure from 4 to $4\frac{1}{2}$ inches in length. They are divided into three parts for the sake of description :—

(1) The interstitial part, which lies in the uterine wall.

(2) The ampullar part, *i. e.* the distal extremity of the tube. It is the widest portion of the tube, and ends in a number of fringe-like terminations.

(3) The isthmus, or the intermediate part which connects the ampulla and the interstitial part of the tube.

The tube is covered for three-fifths of its circum-

ference by the peritoneum which forms the broad ligament, the remaining two-fifths lying between the layers of the broad ligament. The blood-supply of the tube is received partly from the uterine, partly from the ovarian arteries, and returns through the uterine and ovarian veins. The nerve-supply and the lymphatic system are the same as those of the ovary.

III. *The Uterus*.—The uterus, when the bladder is empty, normally lies almost horizontally within the pelvis, its anterior surface resting upon the bladder. The non-impregnated uterus is about 3 inches in length, $1\frac{1}{2}$ inches in its greatest width, and 1 inch in thickness. It consists of two parts, the body and the cervix, which are united by the isthmus at the level of the os internum. The entire body is covered with peritoneum, except at the sides, whence it is reflected to form the broad ligament. Anteriorly, the peritoneum is reflected on to the bladder, at the level of the os internum. On the posterior wall the peritoneum covers the uterus as far as the middle of the cervix, whence it is continued on to the posterior vaginal wall. The uterine wall consists of three coats,—a mucous or internal coat, a muscular or middle coat, and a peritoneal or external coat. The mucous coat is traversed by numerous tubular and branching glands, which are lined by columnar epithelium. The muscular coat consists of bundles of unstriated muscle-fibres, some of which run longitudinally, others circularly. The blood-supply of the uterus is received mainly from the uterine artery, a branch of the internal iliac, but also to a less extent from the ovarian artery. The uterine veins form a

plexus in the broad ligament, and then terminate in the internal iliac vein. The nerve-supply of the uterus is the same as that of the ovaries and tubes. The lymphatics of the body end in the retroperitoneal glands, those from the cervix in the internal iliac glands, near the point of bifurcation of the common iliac artery.

IV. *The Vagina*.—The vagina is the canal connecting the uterus with the external organs of generation. It is lined with a mucous membrane which is covered with squamous epithelium, and is extremely dilatable. The vagina contains no glands. Normally its anterior wall measures about $2\frac{1}{2}$ inches in length, its posterior wall about $3\frac{1}{2}$ inches.

The external organs of generation comprise the mons Veneris, the labia majora and minora, and the clitoris. They do not call for any special remarks.

The Decidua.—The *decidua vera* is the term applied to the outermost covering of the ovum. It is formed from the hypertrophied and altered mucous membrane which lines the uterus during pregnancy. As the ovum enters the uterus it is received into this mucous membrane, which then grows over it forming an investing layer—the *decidua reflexa*. As the ovum grows and fills the uterine cavity the decidua reflexa is brought into contact with the decidua vera covering the portion of the uterus to which the ovum was not attached, and finally, about the third month, the two blend and form one layer. The *decidua serotina* is the term applied to the portion of decidua vera on which the ovum is first implanted, and which subsequently helps to form the placenta.

The Ovum.—The ovum is composed of the following parts :—

- (1) Placenta.
- (2) Chorion.
- (3) Amnion.
- (4) Umbilical cord.
- (5) Liquor amnii.
- (6) Fœtus.

(1) *The Placenta.*—The placenta is formed in part from the chorion and its villi, in part from the decidua serotina. It is thus partly fœtal and partly maternal. In shape it is almost circular, with a diameter of from 7 to 8 inches. It is about $1\frac{1}{4}$ inches thick at the centre, and weighs about one pound.

(2) and (3) *The Membranes.*—The chorion and the amnion are respectively the outer and inner layers of the fœtal membranes. They are purely fœtal in formation.

(4) *The Umbilical Cord.*—This is the means by which the fœtal blood is brought to and from the placenta. It consists of two umbilical arteries and one umbilical vein. The arteries convey deoxygenated blood to the placenta, the vein returns reoxygenated blood to the child. Surrounding these vessels lies the Whartonian jelly, while the entire cord is covered by amnion. There are also found in the cord the remains of the allantois and of the vitelline duct. The normal length of the cord is about 22 inches, but it has been found to vary between 6 and 64 inches.

(5) *The Liquor Amnii.*—The liquor amnii is the fluid which fills the amniotic sac, and in which the fœtus floats. Its normal quantity is from 2 to 5

pints, but as much as 20 pints have been recorded. It is formed principally by transudation from the blood-vessels of the mother, also by the excretion of the foetal skin and kidneys, and by transudation from the placenta and umbilical cord (Winckel). It prevents undue pressure upon the foetus or umbilical cord, it separates the layers of amnion and so prevents their adhering, and during labour it helps to dilate the cervix and to wash out the vagina.

(6) *The Foetus*.—The following table, taken from 'Dührssen's Midwifery,' shows the length of the foetus in centimetres, at the end of the different months. At the end of each month up to the fifth, the length of the foetus in centimetres is equal to the square of the number of the month. After the fifth month its length is obtained by multiplying the number of the month by five.

| Number of Month. | | | | | Length of Foetus in Centimetres. |
|------------------|---|---|--------|---|----------------------------------|
| 1 | . | . | 1 × 1 | = | 1 ($\frac{2}{5}$ inch). |
| 2 | . | . | 2 × 2 | = | 4 ($1\frac{3}{5}$ inches). |
| 3 | . | . | 3 × 3 | = | 9 ($3\frac{3}{5}$ „). |
| 4 | . | . | 4 × 4 | = | 16 ($6\frac{2}{5}$ „). |
| 5 | . | . | 5 × 5 | = | 25 (10 „). |
| 6 | . | . | 6 × 5 | = | 30 (12 „). |
| 7 | . | . | 7 × 5 | = | 35 (14 „). |
| 8 | . | . | 8 × 5 | = | 40 (16 „). |
| 9 | . | . | 9 × 5 | = | 45 (18 „). |
| 10 | . | . | 10 × 5 | = | 50 (20 „). |

The Foetal Skull.—The following are the important diameters of the foetal skull:—

| | | | |
|---------------------------------|---|---|----------------------------------|
| Sub-occipito-bregmatic diameter | . | = | $3\frac{3}{4}$ inches (9·5 cm.). |
| Cervico-bregmatic | „ | . | = $3\frac{3}{4}$ „ (9·5 „). |
| Fronto-mental | „ | . | = $3\frac{1}{5}$ „ (8 „). |

| | | |
|---------------------------------|---|---------------------------------|
| Occipito-mental diameter . . . | = | $5\frac{1}{4}$ inches (13 cm.). |
| Supra-occipito-mental diameter | | |
| (maximum diameter of Budin) | = | $5\frac{2}{5}$ „ (13.5 „). |
| Occipito-frontal diameter . . . | = | $4\frac{1}{5}$ „ (12 „). |
| Sub-occipito-frontal „ . . . | = | $4\frac{2}{5}$ „ (11 „). |
| Bi-parietal „ . . . | = | $3\frac{3}{4}$ „ (9.5 „). |
| Bi-temporal „ . . . | = | $3\frac{1}{5}$ „ (8 „). |

The sub-occipito-bregmatic diameter, *i.e.* the distance between the bregma, or large fontanelle, and a point below the occipital prominence, is the greatest diameter of the head that has to pass through the brim in a vertex presentation. The cervico-bregmatic diameter, *i.e.* the distance between the bregma and a point representing the junction of the neck and chin, is the greatest diameter that has to pass through the brim in a face presentation. The supra-occipito-mental diameter, *i.e.* the distance between the chin and the most distant part of the occiput, is the greatest diameter that has to pass through the brim in a brow presentation.

The sutures are the intervals between the bones of the cranium. They consist of the lambdoidal, between the occipital and the parietal bones; the sagittal, between the parietal bones; the coronal, between the frontal and the parietal bones; the frontal, between the two lateral portions of the frontal bone; and the temporal sutures (2) between the squamous portions of the temporal bone and the frontal, parietal, and occipital bones.

The fontanelles are the angular spaces formed by the intersection of the various sutures. There are two principal fontanelles:—

(1) The anterior fontanelle, the large fontanelle, or the bregma, is situated at the junction of the sagittal, coronal, and frontal sutures. It is lozenge-shaped, and four sutures can be felt meeting to form it.

(2) The posterior fontanelle, or the small fontanelle, is situated at the junction of the lambdoidal and sagittal sutures. It is triangular, and three sutures can be felt meeting to form it.

There are also four accessory fontanelles, two at either side :—

(1) and (2) The antero-lateral fontanelles at the junction of the coronal and temporal sutures.

(3) and (4) The postero-lateral fontanelles at the junction of the lambdoidal and temporal sutures.

The different fontanelles can be distinguished when making a vaginal examination, by comparison of their size or shape, and by the difference in the number of sutures which meet to form them.

CHAPTER III.

THE DIAGNOSIS OF PREGNANCY.

The Diagnosis of Pregnancy—The Doubtful, Probable, and Certain Signs of Pregnancy—Estimation of the Date of Pregnancy—Is the Fœtus Alive or Dead?

ONE of the most important questions that comes before the obstetric physician, is the task of diagnosing the existence or non-existence of pregnancy. The diagnosis may be all-important, and the result of a mistake disastrous. The physician who undertakes the consideration of the question should always remember that, though the evidence may be tolerably certain so far as he is concerned, still his diagnosis must be guarded unless absolute certainty dictates it.

The diagnosis is based on certain subjective and objective symptoms.

Amongst the former are classed the cessation of the menses, morning sickness, the movements of the fœtus as felt by the patient herself, salivation, and longings or pica. These in themselves are of slight importance. The patient may wilfully deceive us, or be herself deceived. But when we consider them in conjunction with the objective symptoms, and when we find that the one confirms the other, then they become of value.

And now to consider the objective symptoms. I

shall presume that there is no difficulty in the way of a full, thorough, and sufficient examination of the patient. This being so, it is best to examine her in the routine manner adopted in disease.

The Face.—In some cases there is excessive pigmentation occurring at the sides of the nose, under the eyelids, and about the upper lip.

The Breasts.—The first change noticed in the breasts comes on about the second month, and consists in an enlargement of the superficial veins and of the breast itself, whilst at the same time the nipple and primary areola have a puffy appearance, and glandular follicles develop upon the latter (Montgomery's follicles). During the next couple of months the colour of the primary areola deepens in proportion to the complexion of the patient, and its diameter becomes increased. During the fifth month the secondary areola becomes noticeable round the primary areola—"numerous round spots or mottled patches of a whitish colour scattered over the outer part of the areola, and for about an inch or more all round, presenting an appearance as if the colour had been discharged by a shower of drops falling upon the parts" (Montgomery). From the sixth month on, shining red lines radiating from the primary areola appear, due to over-distension, and akin to the *striæ gravidarum* of the abdomen. On palpation from the second month onward the breasts are found to be firmer and more knotty than in non-pregnant women. If they are squeezed, colostrum may exude from the nipple. Some of these changes have also been noticed in cases of myomata of the uterus and ovarian tumours (v. Fig. 1).

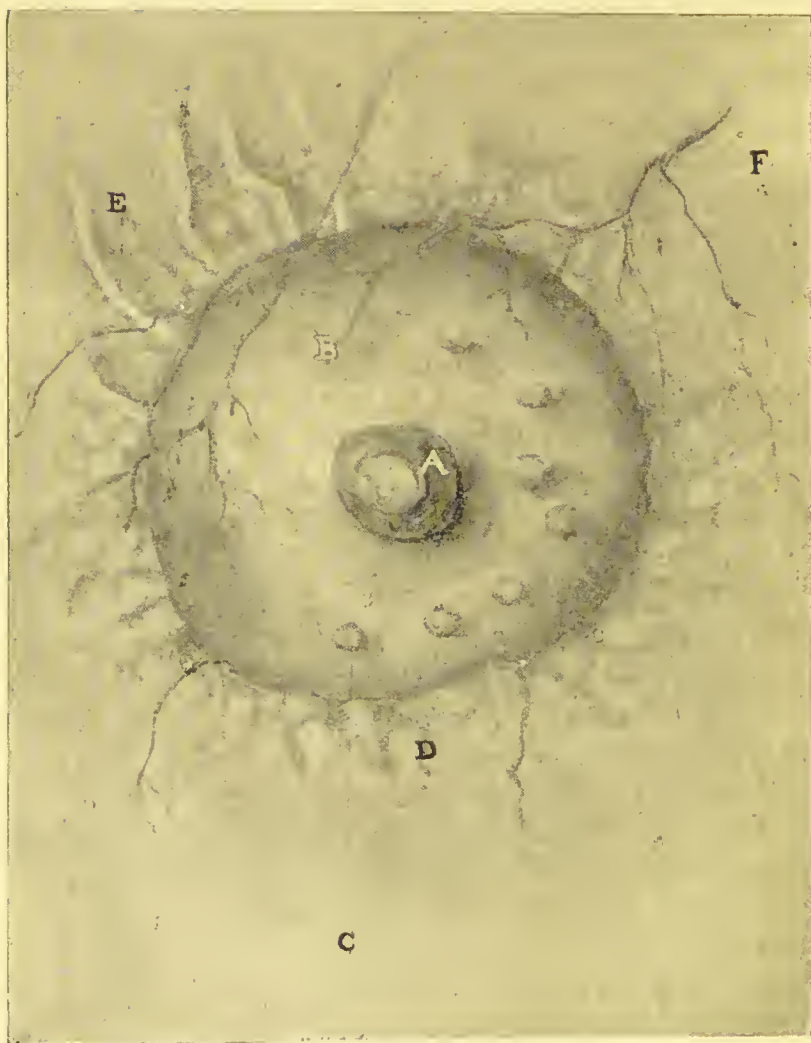


FIG. 1.—Breast at the seventh month of pregnancy. A. Nipple. B. Primary areola. C. Montgomery's follicle. D. Mottling of secondary areola. E. Striae. (*Montgomery.*)

The Abdomen.—*Inspection.*—The abdomen is enlarged in correspondence to the period of pregnancy; and as a result of the stretching of the abdominal walls the *striæ* or *lineæ gravidarum* appear. They are red or bluish lines radiating upwards from the mons Veneris, and are due to a loss of elasticity in the cutis vera and the rete Malpighii, consequent on the stretching caused by the enlarging uterus (Winckel). The abdomen also may be more or less pigmented, especially in the middle line and about the groin.

Percussion.—By this means we map out the size of the abdominal tumour, and determine whether it is dull or resonant. By this means flatulence and phantom tumours may be excluded.

Palpation.—A tumour is felt if the third month is passed. Its size can be determined, and its consistency, the regularity of its surface, and the irregularity of its contents. In pregnancy the enlarged uterus feels smooth and ovoid, and irregularities in its contents can be felt, viz.: the foetal parts. The foetus can be moved about between the two hands,—that is, external ballottement can be obtained. As we examine, we notice that the uterus becomes hard from time to time, *i. e.* it contracts. There is no pain accompanying these contractions.

Auscultation.—Over the abdomen of a pregnant woman several different sounds can be heard:—

(1) *The foetal heart.* This is heard from the sixteenth week onward, beats at the rate of 130 to 150 per minute, and sounds like the ticking of a watch.

(2) *The uterine souffle.* It is a blowing sound produced in the ascending branches of the uterine

arteries; it is heard more plainly over some parts of the uterus than others, and of course is synchronous with the mother's pulse.

(3) *The funic or umbilical souffle.* It is produced in the vessels of the cord, probably in the umbilical vein. It is synchronous with the foetal heart, and generally is caused by the cord being twisted round the child, or by its being compressed beneath the stethoscope. Its presence is usually of unfavourable import for the child.

(4) *The maternal heart-sounds.* If they are rapid they may be mistaken for the heart-sounds of the child, to avoid which the finger should always be placed on the mother's pulse whilst auscultating the foetal heart.

(5) *Respiratory murmur of the mother.*

(6) *Movements of the child.*

(7) *Friction between uterus and abdominal wall.*

(8) *Crepitating noises* due to air in uterus or abdominal walls.

(9) *The muscular susurrus*, that is the note given out by contracting muscle-fibre.

(10) *Intestinal sounds—borborygmi.*

The Vulva and Vagina.—*Inspection.* The vulvar and vaginal mucous membrane becomes of a bluish-purple colour, due to venous stasis. This is Jacquemin's and Spiegelberg's sign of pregnancy. It is noticed also in uterine myomata and ovarian tumours, when they attain any considerable size. But in the case of pregnancy it occurs with a smaller uterine enlargement than in the case of myomata.

Vaginal examination.—This is next made with the patient in the dorsal position, and it is upon the

information it gives, supplemented by the patient's history, that we chiefly rely for the diagnosis of pregnancy in the early months. First note the consistency of the cervix. It commences to soften from the beginning of pregnancy, and this softening starting below extends upwards as pregnancy advances, until at term it is so marked that the cervix can hardly be felt. It is more marked in multiparæ than primiparæ. Then try to obtain internal ballottement. It can be got by passing the fingers into the anterior fornix and pressing suddenly upwards against the uterus. Keep the fingers in the same position, and if the case is suitable the displaced fœtus will be felt to fall back upon them, causing a slight sensation of shock (*choc en retour*). The occurrence of this phenomenon depends on two factors: first, that the fœtus is large enough to be felt; secondly, that it is sufficiently moveable in the liquor amnii to be easily displaced. Both these factors are present during the fourth and fifth months. This sensation of ballottement can be simulated by other conditions—a pedunculated myoma or malignant masses floating in ascitic fluid, and a large calculus lying in a distended bladder. The *choc en retour* is also very closely imitated by a pulsation of the uterine artery under certain conditions. If when pressing the fingers upwards we compress the uterine artery, its pulsations cease. Then, as the pressure of the fingers is involuntarily lessened the artery beats again, conveying an impression to the finger exactly like that of ballottement. This mistake is of course easily avoided by keeping the fingers in the same position for a little

longer, when the subsequent pulsations of the vessel will be felt.

Next note the increase in size of the uterus, the fact that its antero-posterior diameters are increased, *i. e.* that it becomes globular, and that it is softer than usual.

Now attempt to get Hegar's sign of pregnancy—the marked softening of the lower uterine segment. It is best obtained by passing the thumb into the vagina and one finger into the rectum, and then pressing the fundus downwards with the other hand

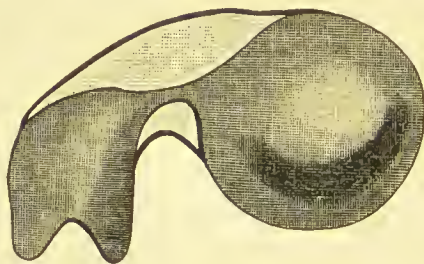


FIG. 2.—Hegar's sign of pregnancy. The heavy outline represents the *actual* shape of the uterus; the shaded portion represents its *apparent* shape as ascertained by recto-vaginal examination. ('The Norris Text-book of Obstetrics.')

on the abdominal wall, so that the lower uterine segment can be grasped between the finger and thumb. If pregnancy is present, the whole lower uterine segment is so softened that there seems to be no connection between the fundus and the cervix. At the same time the fundus gives the impression to the finger that it is globular (*v.* Fig. 2). This is a tolerably reliable sign. It is found from the second month onwards, but may possibly be obtained in a

non-pregnant uterus, especially after complete or incomplete abortion.

Lastly, palpate the ureters; they hypertrophy during pregnancy. To find them palpate the back of the symphysis with the finger in the vagina, and then, starting above at one side of the joint, draw the finger downwards and slightly outwards along the back of the pubes. The ureter, which here lies between the anterior vaginal and the posterior bladder wall, is displaced forwards against the pubis, and is felt to slip from under the finger. It will require some practice to be able to tell if it is enlarged or not. If it is felt at all by the student it is probably hypertrophied, as it is difficult to feel a non-hypertrophied ureter. While we are palpating the ureter the increased pulsation in the lateral fornices is also noticed.

Now let us consider the value of these different signs. They can be divided into doubtful, probable, and certain signs, and can be classified accordingly.

| Doubtful. | Probable. | Certain. |
|--------------------|------------------------|-------------------|
| Nausea. | Breast changes. | The foetal parts. |
| Salivation. | Internal ballottement. | The foetal heart. |
| Pigmentation. | Blue colour of vagina. | Movements of |
| Longings. | Increased pulsation in | foetus when |
| Cessation of the | lateral fornix. | felt or heard |
| menses. | Softening of lower | by doctor. |
| Enlargement of ab- | uterine segment. | Funic souffle. |
| domen. | Enlargement of the | |
| | uterus. | |
| | Uterine souffle. | |
| | Hypertrophy of the | |
| | ureters. | |

In default of certain signs, a probable diagnosis

can be made by noting a correspondence between the subjective and objective symptoms. For instance, if the duration of amenorrhœa correspond with the size of the uterus, or if the date of quickening correspond with either of them, then we have a very reliable clue to the situation. The diagnosis has to be made in the early months from any condition which may give rise to enlargement of the uterus, as sub-involution, metritis, or small myomata. The menstrual history will then usually suffice. Also from acquired amenorrhœa, due to anæmia, phthisis, change of conditions of life, &c. This class of cases is much more difficult to diagnose. A certain diagnosis can only be arrived at in course of time. In the later months a diagnosis has to be made from ovarian and uterine tumours, particularly myomata, from ascites, flatulence, phantom tumours &c. The menstrual history, the time occupied by the growth of the tumour, the absence of fœtal parts, and the possibility in some cases of separating the tumour from the uterus, will usually suffice to make the diagnosis. In *pseudo-cyesis*, the abdomen is resonant, and if a whiff of chloroform is administered to the patient, the tumour disappears.

When a diagnosis has been made of the existence of pregnancy, we have to decide how far pregnancy has advanced. This can be accomplished by various methods, none of them, unfortunately, being very exact. The first way that naturally occurs to us is to count the weeks that have elapsed since menstruation ceased. This method, although uncertain, will usually bring us within a fortnight of the true period, if the woman's history is correct. We can

confirm this by inquiring the date at which quickening occurred, especially in multiparæ, who are naturally more skilled in detecting it. It usually takes place about the eighteenth week, but here again there may be an error of about a fortnight, too much or too little.

Much more reliable than either of these methods is the information given by the height of the uterus. If the pelvis of the patient, and the size of the uterus, are normal, then by noting the height of the fundus we can tell at once in what month of pregnancy she is. This can best be described in tabular form :—

| | |
|-------------------------|---|
| At the end of 2nd month | the uterus is the size of a large orange. |
| „ 3rd „ „ „ | foetal head at term. |
| „ 4th „ | the fundus is at level of top of symphysis. |
| „ 5th „ „ | midway between symphysis and umbilicus. |
| „ 6th „ „ | at umbilicus. |
| „ 7th „ „ | three fingers' breadth above umbilicus. |
| „ 8th „ „ | halfway between umbilicus and ensiform cartilage. |
| „ 9th „ „ | up to ensiform cartilage. |
| „ 10th „ „ | same as at 8th month. |

By comparing the various methods which I have described the period of pregnancy can be estimated tolerably exactly, and the chance of errors in the patient's history eliminated as far as possible.

Assuming that the height of the uterus tends to prove that the menstrual history may be relied on,

we can tell approximately the date of delivery by the method of Naegele or Matthews Duncan. Pregnancy is usually divided into ten menstrual periods of four weeks each, that is 280 days. Naegele counted from the first day of the last menstruation. He subtracted three months from that, and then added seven days, or in leap year six days if February were included in the time. For instance, if the patient began to menstruate on July 1st, count back three months, to April 1st; then add seven days, to April 8th; count forward a year, and the result will be the date of delivery. The method of Matthews Duncan is slightly different. He counted from the last day of last menstruation, and added on nine months and three days to it. If the menstruation which began on July 1st ended on July 5th, then nine months and three days added on brings the date to April 8th again.

Reckoning from the date of *quickening*, *i. e.* the day on which the mother first feels the movements of the foetus, and supposing quickening to occur at the eighteenth week, by adding on twenty-two weeks we get the required date. The date thus found must not be considered absolute; it is the centre of a fortnight during which delivery will probably occur.

The last question to be decided is, whether the foetus be alive or dead. Of course the fact that pregnancy is continuing is usually an indication that the foetus is alive. A dead child usually induces labour, but sometimes it may be retained in the uterus. If the patient is past the sixth month, and still no heart can be heard on the most careful and repeated auscultation, the foetus is probably dead.

If the woman has felt the child frequently, and one day noticed unusually active movements, and after that a complete cessation of movement, the foetus is probably dead. Lastly, if in conjunction with these symptoms we find that a uterus, which steadily increased in size up to a certain day, has ceased to increase any further, and rather is diminishing in size, the diagnosis is complete.

The woman's symptoms are also of importance. If the child has been dead for any length of time, she begins to lose her appetite, and to become thinner and weaker. She complains of a disagreeable taste in her mouth, and her face assumes a yellowish tinge. Then on making a vaginal examination it may be possible to feel the cranial bones loose and moveable under the skin. If the membranes have ruptured the foetus decomposes, and a foetid discharge comes away from the vagina.

CHAPTER IV.

LABOUR AND ITS PHENOMENA.

Definition of Labour—Causes—Diagnosis—Stages—Phenomena :
Physiological, Plastic, Mechanical.

Definition.—Labour is the term applied to the process which severs the connection between the mother and the ovum, and removes the latter from the organism of the former (Winckel). The process is classified as follows:—

- (1) *Abortion*, when it occurs before the formation of the placenta, *i. e.* before the commencement of the fourth lunar month.
- (2) *Partus immaturus*, or *miscarriage*, when it occurs after the formation of the placenta, but before the child is viable, *i. e.* from the commencement of the fourth to the end of the seventh lunar month.
- (3) *Partus prematurus*, or *premature birth*, when it occurs after the child has become viable, but before full term, *i. e.* before the end of the tenth lunar month.
- (4) *Partus maturus*, or *full-term birth*, when it occurs at the end of the tenth lunar month.
- (5) *Partus serotinus*, or *delayed birth*, when it occurs more than forty-one weeks after conception.

At present we are concerned only with *partus maturus*, or full-term birth.

Causes of Labour.—What the factors are which cause a pregnant uterus to contract at the tenth menstrual period after conception, and to expel its contents, is little known. So far our views are but the results of conjecture. We know that certain changes occur during pregnancy, and we infer a consequence for them. What these changes are I shall state in a few words:—

(1) The uterus and ovum increase in size during pregnancy. In the earlier months the uterus grows more rapidly than the ovum, but in the later months the ovum grows faster than the uterus. Hence it comes about that, towards the end of pregnancy, the growing ovum tends to become too large for, and so to exert a distending pressure upon, the uterus.

(2) During the entire period of pregnancy the uterus shows a certain amount of irritability and a tendency to contract intermittently. This irritability is especially marked at the menstrual period, and becomes more marked with each successive period. It shows itself by the painless contractions of the uterus—an intermittent series of contractions which can be felt by laying the hand upon the uterus, especially in the later months of pregnancy.

(3) The cells of the decidua vera undergo a fatty degeneration toward the end of pregnancy.

(4) Large giant-cells appear in the decidua serotina. After the eighth month they invade the uterine sinuses, cause coagulation of the blood in them, and give rise to the growth of young connec-

tive tissue. This growth of connective tissue in turn tends to obliterate the venous sinuses, and according as this process continues the amount of venous blood in the intervillous spaces is increased.

(5) There is one motor centre for uterine contraction in the medulla oblongata. Excess of carbonic acid gas in the maternal blood stimulates it. The rapidly growing foetus daily extracts more oxygen from the maternal blood, and returns, instead of it, a daily increasing quantity of carbonic acid gas. Direct stimuli applied to the uterus will also cause contraction by means of a reflex centre in the spinal cord, and the CO_2 in the uterine sinuses here again will act as the stimulus. On the other hand, it may be that it is not the excess of CO_2 so much as the diminution of oxygen that acts thus (Runge).

These are the facts which we know. What conclusions may we draw from them? We have a series of changes occurring in the uterus and its contents, changes that become more marked daily as pregnancy advances. The uterus is becoming more and more distended by the growing ovum, and one day it must become over-distended. The irritability of the muscular fibres is increasing daily, and is tending to cause a separation between the ovum and the uterus. The fatty degeneration of the decidual cells is paving the way for this separation to occur more easily. Once it occurs, the ovum becomes a foreign body, and is expelled accordingly. The giant-cells and young connective tissue cause a venous condition of the blood in the uterine sinuses, which furnishes an ever-increasing

peripheral stimulus to the centres in the cord. The growth of the fœtus, daily abstracting more oxygen from the mother, causes a daily increasing excess of CO_2 in the maternal blood, so furnishing the necessary stimulus for the medulla. All these are predisposing factors; and, ever increasing, apparently come to a climax at the tenth menstrual period. An exciting cause is furnished by some sudden movement—straining at stool, a violent cough, or the like; the period of unstable equilibrium comes to an end, and labour commences.

Is the patient in labour?—This is a difficult question to decide in the early stages of labour. Later, when the patient is having strong labour pains, there is no difficulty in making a diagnosis. Also, in many cases we may say definitely that the patient is not in labour at the moment of examination, but still we are unable to say that she will not be in labour within the next hour. And frequently cases are sent out of hospital in the morning obviously not in labour, who return the same evening, perhaps, as a case of street delivery.

To decide the question a careful examination of the patient must be made. Commence by palpating the abdomen, and notice if the presenting part is fixed, and if the uterus contracts intermittently. The fixity of the head is a tolerably reliable guide in multiparæ, but is of no value in primiparæ. In the former, as a rule, the head does not become fixed until the onset of labour; in the latter it is fixed for the last three or four weeks of pregnancy. There are a few conditions which by their presence prevent the head from becoming fixed at its proper

time, and so cause exceptions to this rule. These are:—contracted pelvis, hydramnios, hydrocephalic head, face or brow presentation, twins, placenta prævia. In the absence of these exceptions, the rule given above may be relied on; and, if we find the head not fixed in the case of a multipara, probably she is not in labour, and *vice versâ*. If uterine contractions can be felt, find out if the patient complains of pain during them,—that is if the contractions are painful or painless. The presence of painless contractions may be taken as a sure indication that she is not in labour, of painful contractions that she is.

A vaginal examination must next be made, with a view to discovering whether the cervix is dilating or not. If it is only slightly dilated, the patient may not be in labour. One frequently finds in the case of multiparæ an os the size of sixpence a considerable time before labour has set in. In primiparæ, however, the external os does not dilate until the patient has been for some time in labour.

There are two other points of slight importance. One is the so-called “show,” a blood-stained mucous discharge which comes from the cervix and vulvar glands for one or two days before labour sets in. Another is the onset of false pains which occur in various parts of the abdomen, but not in the back.

Stages.—Labour is divided into three stages:—

- (1) The first stage, or stage of dilatation.
- (2) The second stage, or stage of expulsion.
- (3) The third stage, or placental stage.

The first stage commences with the onset of true labour pains, and lasts until the full dilatation of the

os and the rupture of the membranes. Its average length is, in primiparæ, about eleven to twelve hours; in multiparæ, about six to eight hours. The second stage commences with the full dilatation of the os, and ends with the expulsion of the child. Its average duration is from one to two hours in primiparæ and ten to fifteen minutes in multiparæ. The third stage commences after the birth of the child, and ends with the expulsion of the placenta. Its length varies greatly according as it ends spontaneously, or is ended artificially.

Phenomena.—The phenomena of labour are usually divided into three groups,—physiological, plastic, and mechanical.

Physiological Phenomena.—These include the uterine contractions and their effect upon the ovum and upon the soft parts of the mother.

The so-called ‘labour pains’ are a series of pain-causing contractions of the muscular fibres of the uterus and ligaments, which occur intermittently, and sweep over the organ as a peristaltic wave. They act in such a manner as to cause a diminution in the transverse diameters of the uterus, and an increase in the longitudinal diameter and in the thickness of the walls. The result of the contraction is also to diminish the cavity of the uterus, and so to cause pressure upon the ovum. When a body is acted upon by several forces, which are not in equilibrium, it tends to move in the direction of least resistance. The ovum, which from the nature of its contents is incompressible, when pressed upon by the contractions of the uterus, tends to bulge downwards against the lower uterine segment, and

so comes to press upon the internal os. Three factors unite in making the region of the internal os the area of least resistance. These are :—

- (1) The muscle-fibres in that part of the uterus are less numerous, and so the contractions are not so strong as in other parts.
- (2) The pressure of the abdominal walls and contents tends to drive the ovum downwards.
- (3) Gravity also pulls the ovum down in the same direction.

While the uterine contractions are at work intermittently diminishing the uterine cavity, there is another and more persistent change taking place in the uterine muscle. This is the phenomenon of retraction of the muscle-fibres. To understand it properly, it must be known that the uterus consists of two distinct parts or segments,—an upper or contractile segment, and a lower or non-contractile segment. The junction between these two segments is, at the commencement of labour, slightly above the internal os. During a pain the fibres which compose the upper segment not only contract but retract. By contracting, each fibre diminishes in length; while, by retracting, the fibres come actually to assume new positions, at least in their relationship to one another; so that fibres which originally lay end to end come, after a little time, to lie parallel. Retraction of the fibres is permanent, so that they do not return to their original positions when the contraction is over. The effect of retraction on the uterus is that the fibres tend to become drawn upwards towards the fundus; consequently, the contractile portion of the uterus becomes

thicker and shorter and the non-contractile portion becomes thinner and longer. In other words, the junction between the upper and lower uterine segments tends to move upwards towards the fundus. To this junction the term contraction ring is applied. The ring can be felt through the abdominal walls as a depression, running across the uterus, in cases in which labour has been strong or unduly protracted. It is most essential to be able to recognise this ring, as it gives an absolute indication of the effect of the uterine contractions on the uterine walls. In normal labours it can seldom be felt, as it does not rise above the symphysis pubis. If labour is protracted it rises gradually upwards (*v.* Fig. 44). There is said to be threatened rupture of the thinned lower uterine segment if the contraction ring rises more than $1\frac{1}{2}$ inches above the symphysis.

The taking up of the cervix and dilatation of the uterine orifice are the two most important changes that occur during the first stage. The former is the process by which the cervical canal is made continuous with and, so, part of the lower uterine segment. Two factors unite to bring about this taking up :—

- (1) The softening of the cervix, which has been extending from below upwards throughout pregnancy.
- (2) The action of the uterine contractions, which tend to drive the ovum downwards, and at the same time to pull up the cervix over the advancing ovum.

The exact course which this process of taking up follows differs considerably in primiparæ and

multiparæ. In the former, at the commencement of labour the cervix is long and presents its normal outline, having both the internal and external os closed. The first step consists in the dilatation of the internal os, then of the supra-vaginal portion of the cervical canal, and then of the infra-vaginal

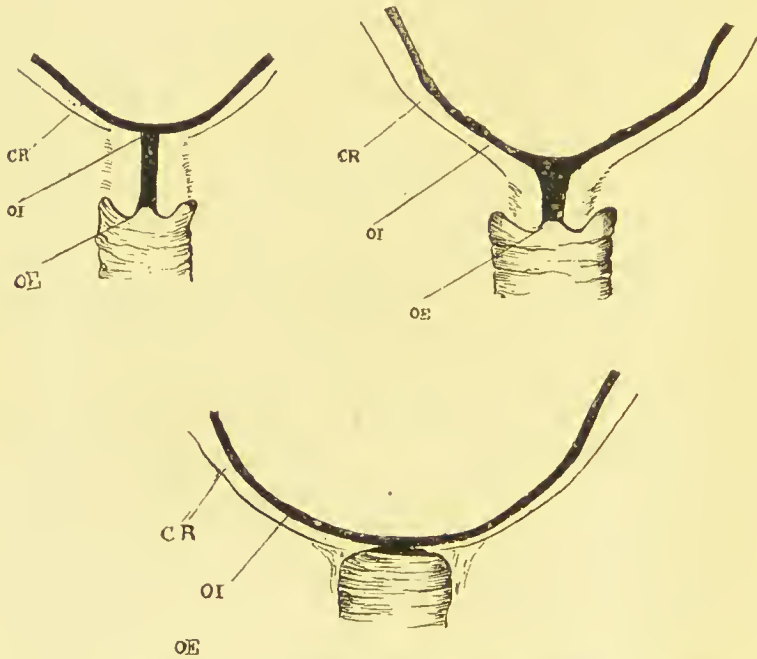


FIG. 3.—Diagrammatic representation of the manner in which the cervix is taken up in the case of a primipara. OE. Os externum. OI. Os internum. CR. Contraction ring. (*Schroeder.*)

portion. As soon as this has occurred the taking up of the cervix is complete, and the uterine and cervical cavities are continuous. The original os externum, or the uterine orifice as it is now called, is still undilated (*v.* Fig. 3).

In multiparæ at the commencement of labour the

external os is as a rule sufficiently dilated to admit one or two fingers, and the cervical canal somewhat everted. The result of this is that when an examination is made, the finger first impinges on the internal os, which conveys the impression that it is the lowest portion of the cervix. As soon as the

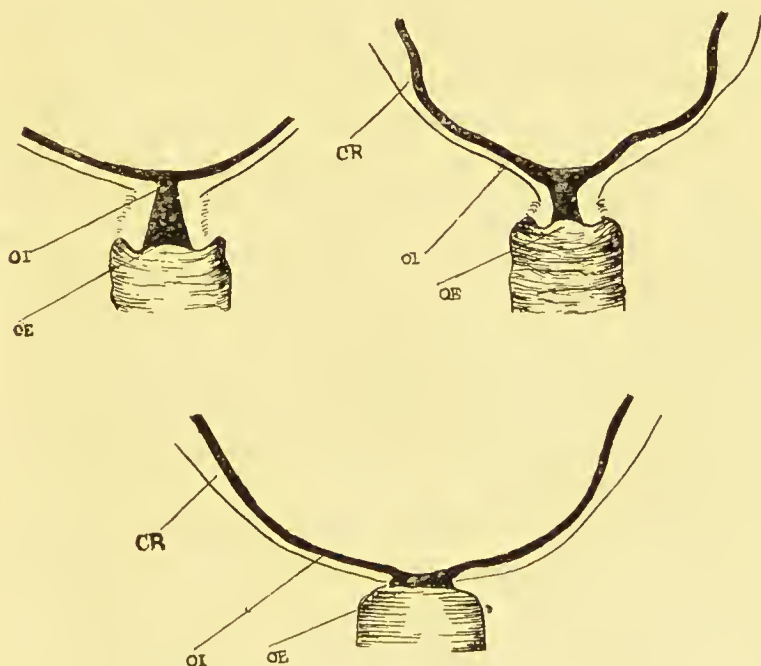


FIG. 4.—Diagrammatic representation of the manner in which the cervix is taken up in the ease of a multipara. (The letters are the same as in Fig. 3.) (Schroeder.)

uterine contractions begin the inner os dilates, and then the everted cervical canal. The walls of this latter retract, and so dilate more synchronously and *en masse* than is the case in the primiparous os, in which the dilatation travels from above downwards. The results of this are that as soon as the taking up

of the cervix is finished the uterine orifice is encircled by blunt comparatively thick edges, instead of, as in a primiparæ, by extremely thinned-out edges; also that in multiparæ the edges of the uterine orifice are formed by the portion of the cervical walls which has not been taken up, in primiparæ by the narrow margin of the old external os alone (*v.* Fig. 3 and 4).

The dilatation of the uterine orifice next occurs, and is brought about in the same manner as the former process, *i. e.* by the downward pressure of the ovum and the retraction of the projecting edges of the orifice over this latter. As soon as these edges have become so completely drawn up as to be practically obliterated, and the uterine and vaginal cavities are continuous, the os is said to be fully dilated, the membranes rupture as a consequence of the pressure of the advancing head, and the patient passes into the second stage of expulsion.

During the second stage the uterine contractions continue, and, supplemented by the voluntary bearing-down efforts of the patient, drive the fœtus downwards. The vagina and perinæum become distended by the passage of the latter, which is then born. The distensibility of these latter as also of the cervix is caused by a softening of the tissues under the influence of a serous transudation which takes place into them. This transudation is due to a hyperæmia of the vessels and to the fact that the return flow through the veins is impeded.

The birth of the fœtus terminates the second stage, and the patient passes into the third or placental stage. Its physiological phenomena still are,

the occurrence of intermittent contractions, and of permanent retraction, of the muscle-fibres. The result of these is, that the placenta is separated and expelled from the uterus, while, at the same time, the vessels are obliterated, and hæmorrhage thus prevented.

There has been much controversy regarding the exact manner in which the placenta is naturally separated and expelled from the uterus. Schultze maintains, that, as the placenta is separated, a hæmatoma forms behind it, and that as the uterus contracts this hæmatoma forces the placenta downwards into the membranes, which are thus inverted. The placenta thus comes out with its foetal surface outside, and the membranes are turned inside out. Matthews Duncan, on the other hand, said that this method never happens unless the cord is pulled upon. He thought that the placenta comes out edgewise, in the same manner as a button goes through a button-hole. It is not a matter of great practical importance as to which is the mechanism of delivery. As a matter of fact Schultze's method occurs in about three quarters of all cases; but then there is often some traction upon the cord, as the child is born.

Plastic Phenomena.—The changes that occur in the shape of the foetal head, and the formation of the caput succedaneum, are included under this title. The changes in the foetal head, or the moulding of the head, are due to the pressure it is exposed to during its passage through the pelvis; they consist in the shortening of certain diameters of the head, and in the elongation of others. In vertex presen-

tations the occipito-frontal, sub-occipito-bregmatic, bi-temporal, and bi-parietal are diminished ; while the maximum diameter of Budin, or the line running from the chin to a point on the sagittal suture midway between the apex of the occipital bone and the large fontanelle, is increased. These changes are rendered possible by the presence of sutures and fontanelles. One parietal bone is depressed and the other overlaps it. The occipital bone slides under the two parietal bones, and the frontal bone does the same. The cartilage, between the squamous and the petrous portions of the temporal bones, allows the former to be pressed inwards, and thus acts as a hinge.

The *caput succedaneum* is a tumour due to a serous infiltration of the connective tissue, which occurs over the presenting part. The latter is the part of the fœtus which is subjected to the least amount of pressure ; and, accordingly, there is a transudation of serum into its connective tissue. A small quantity of extravasated blood is also present in the tumour, due to the rupture of minute vessels. As the formation of the caput succedaneum is a vital process, and only possible when the blood is circulating through the part, it does not occur in the case of a dead fœtus.

Mechanical Phenomena.—The mechanical phenomena include,—the series of passive movements which the fœtus performs, in order to adapt itself to the varying curves and diameters of the genital canal, and the various changes in position which are forced upon the bones of the pelvis by the passage of the fœtal head through it. The former will be

discussed when dealing with the different presentations, the latter will be dealt with here, as the nature of the presentation has little effect upon them.

As mentioned in a previous chapter (*v.* p. 8), the pelvis, although at other times a rigid structure, permits during parturition certain movements to take place at its joints. At the symphysis pubis the fibres composing the interpubic ligaments soften and elongate, so that a very slight degree of separation is allowed. At the sacro-iliac joints a certain amount of mobility is permitted, so that the sacrum can rotate about these joints on a transverse axis. As the head enters the brim, the promontory is pushed backwards, and thus the conjugate diameter is increased. As the head descends into the pelvis, the promontory returns to its original position, and then becomes depressed, owing to the rotation backwards of the lower pieces of the sacrum under the pressure of the head at the outlet. The sacro-coccygeal joint permits the greatest range of movement. It is a hinge joint, so arranged that the coccyx can be pressed backwards by the head, thus increasing the antero-posterior diameter of the outlet by about three quarters of an inch. In some cases this movement may take place at one of the intercoccygeal joints instead of through the sacro-coccygeal joint.

CHAPTER V.

DIAGNOSIS OF THE PRESENTATION AND POSITION OF
THE FŒTUS.

The Attitude of the Fœtus—The Presentation—The Position—
Diagnosis of the Presentation and Position—Abdominal Palpa-
tion—Vaginal Examination—Auscultation.

Attitude.—The attitude or posture which the fœtus assumes in the uterus is one which reduces it to the smallest possible size. The head is flexed upon the chest, the spine curved forward, the upper limbs crossed on the chest, the thighs flexed on the abdomen, and the legs on the thighs. It thus assumes an ovoid shape, having two poles, the pelvic and the cephalic. The pelvic pole, that is the breech and lower extremities, is larger than the cephalic pole; and the distance between the two poles is the longest diameter of the ovoid.

Presentation.—The presentation of the fœtus is the term applied to that part of the fœtus which is engaged or is tending to become engaged in the pelvic cavity (Ribemont-Dessaignes). Any part of the fœtal ovoid can theoretically present, but, as a matter of fact it is, in a large majority of cases, one or other of the poles. Of these two poles, the cephalic presents far the more frequently. Indeed, out of all full-term labours, almost 97 per cent. of the children come head first. It is easy to understand why the child should present by one or other pole; but why there should be such an overwhelming

proportion of head presentations is not at first so obvious.

In the earlier months of pregnancy the uterus grows more rapidly than the fœtus, and consequently the latter is free to move about and assume any position. As pregnancy advances the fœtus grows more rapidly than the uterus; and as it commences to occupy the entire uterus, it is guided round until its long diameter corresponds with the long diameter of the uterus,—that is, until the fœtus is lying with one pole at the fundus and the other in the lower uterine segment. And again, since the breech and the lower limbs together are more bulky than the head, and since the uterine cavity is also of an ovoid shape whose larger end is uppermost, the pelvic pole is guided to the fundus, and the head is guided to the lower uterine segment (Cazeaux). If this is so, we should expect malpresentation in cases in which the uterus has lost its shape. And so hydramnios, multiple pregnancies, pluriparous uteri, contracted pelves, uterine tumours, all favour malpresentation by destroying the natural shape of the uterus. This law of accommodation, by which the nature of the presentation of the fœtus is almost entirely governed, is well put by Pajot:—When a solid body is contained in another body, if the container is the seat of alternate motion and rest, and if the surfaces are slippery and free from angles, the contained will tend continuously to accommodate its form and dimensions to the form and dimensions of the container.

Another hypothesis, that cephalic presentations are the result of gravity, and that the head falls

into the pelvis because it is heavier than the breech, is still held by some authorities. It does not however receive the attention that it once did, a result due, in the main, to the sufficiency and simplicity of the foregoing explanation.

A third hypothesis attributes the frequency of cephalic presentations to the active movements of the foetal lower limbs. These motions, when opposed by the rigid pelvic wall, tend to drive the breech upwards towards the fundus. As soon as this occurs, opposition to the movements ceases—the rigid pelvis being replaced by the flaccid uterine wall,—and hence there is no tendency to a further change of presentation.

Although, theoretically, almost any part of the foetus may present, still for practical purposes we recognise five chief presentations. These are, in the order of frequency :—

- (1) Vertex presentation, *i. e.* the resultant presentation when the foetus lies in its normal attitude with the head lowest, and in which the vertex, or space between the anterior and posterior fontanelles, presents ; occurring in 95·53 per cent. of all deliveries.
- (2) Pelvic presentations, *i. e.* all presentations of the breech or lower extremities of the foetus, occurring in 3·11 per cent. They are subdivided into :—
 - A. Complete, in which the breech and feet descend together.
 - B. Incomplete, in which (*a*) the breech descends alone, (*b*) one or both knees, (*c*) one or both feet descend first.

- (3) Face presentation, *i. e.* the resultant presentation after full extension of the head, occurring in 0·6 per cent.
- (4) Cross-births, in which some portion of the trunk, most usually one or other shoulder, presents, occurring in 0·56 per cent.
- (5) Brow presentation, *i. e.* the resultant presentation when the head lies midway between flexion and extension, and in which the forehead lies lowest, occurring in 0·2 per cent.

These different presentations are classified in three groups—normal, natural, unnatural. In the group of normal presentations, vertex presentations alone can be placed. In the group of natural presentations are included any presentations which can deliver themselves as such,—that is to say, face presentations and breech presentations. Vertex presentation should, strictly, also be included in this group, if it were not more convenient to assign a special group to it, and to designate it as normal. In the group of unnatural presentations come the presentations which cannot deliver themselves as such, when both the foetus and the pelvic cavity are of normal size, namely, transverse and brow presentations.

To tabulate the presentations and their frequency :—

| | | | | | |
|------------|---|---|---|------|---|
| Normal | Vertex presentations occur in 95·53 per cent. of all cases. | | | | |
| Natural | { Breech | „ | „ | 3·11 | „ |
| | { Face | „ | „ | 0·60 | „ |
| Un-natural | { Transverse | „ | „ | 0·56 | „ |
| | { Brow | „ | „ | 0·20 | „ |

Position.—By position we mean the relationship

which exists between the back of the child and the middle line of the mother, in the case of polar presentations. Cross-births are so irregular as regards both the exact presentation and the direction in which the child lies, that no definition could be found to cover correctly the meaning of the word, in them and in polar presentations. Referring then to polar presentations, we usually classify them into two positions, according as the back is to the left or to the right of the middle line of the mother's abdomen. The former is called the first position, the latter the second. Both of these can be, and indeed sometimes are, divided into two subdivisions, according as the back is inclined anteriorly or posteriorly. Thus are got the four positions of Naegele. But, inasmuch as the mechanism is almost identical whether the back is anterior or posterior, it seems superfluous to recognise more than two positions. And, indeed, each position might be divided into any indefinite number of sub-positions, seeing that the presenting part may enter the brim in any diameter of the brim.

Diagnosis of Presentations and Positions.—A diagnosis of the presentation and position of the fœtus can be made, in any given case, by three methods:—

I. Abdominal Palpation.

II. Vaginal Examination.

III. Auscultation.

Of these, by far the most valuable information can be obtained by means of abdominal palpation. It is, therefore, a subject worthy of careful attention.

I. *Abdominal Palpation.*—In the first place, what

can be learnt by abdominal palpation? In the second place, how is it performed? By palpation of the abdomen we can ascertain seven important facts:—

1. *The presence or absence of pregnancy*, from the sixth month onwards, by feeling a tumour corresponding in size and shape to the uterus, by feeling foetal parts within it, and by obtaining external ballottement.

2. *The period of pregnancy*. By mapping out the height of the uterus (v. page 27).

3. *The presentation and position of the foetus*. To palpate a pregnant uterus thoroughly we use four distinct *grips*, or methods of applying the hands. First, place the patient flat upon her back, with her pelvis straight and her legs extended and slightly separated. Then sit down at her right side, about the level of the pelvis and facing her head. Next lay both hands, gently, flat upon the fundus of the uterus, and feel what is lying there. This is called the *fundal grip*. As a rule, one pole of the foetus will be felt under the hands, either in the middle line or deflected to the left or right. Attention to the following points will enable us to decide which it is:—

(1) *Its mobility*. When the membranes are intact the head can be made by means of a sudden push with the fingers to float about from side to side, *i. e.* ballott, independently of the body of the foetus, owing to its cervical articulation. The breech, on the other hand, can only be moved from side to side *en bloc* with the back.

(2) *Its shape.* The head is hard and smooth, and separated from the body by a transverse groove—the groove of the neck. The breech is not quite so smooth and round, but the difference in this respect is not very great. There is no groove to be felt between it and the body, but the feet may be felt lying beside it.

(3) *Its consistency.* The sides of the head are harder than those of the breech, but both the consistency of the fundal pole of the foetus and its shape are often very much obscured by the placenta.

The hands should be warm; and we must be careful to avoid undue pressure, as it causes pain, and then the woman contracts her abdominal muscles, so rendering further palpation impossible. Avoid also lifting the finger-tips off the abdomen—playing the piano on the abdomen,—as this also causes contractions of the recti. Move the fingers and hands gently from place to place without lifting them off.

Having palpated the fundus, move the hands gently downwards until the level of the umbilicus is reached. Then, in the same manner, make the *umbilical grip*. By rotating the hands about, the nature of the foetal parts at this level can be ascertained. Either the resisting plane of the back will be felt or the irregular outlines of the limbs. In polar and oblique presentations the back lies more or less obliquely in the long axis of the uterus. In true transverse presentations it lies horizontally, but this condition is very rare. If the abdominal walls are

very thick and there is a consequent difficulty in feeling the foetal back, lay the hands on either side of the uterus concentrically with its walls and move them synchronously, first to one side, then to the other, making the uterine contents move with them. By this means one notices that there is a greater resistance offered to one hand than to the other. This resistance is on the side at which the back is.

The next grip is the *pelvic* or *Pawlic's grip*. This is made with the right hand only. Sink the fingers into the false pelvis over the centre of Poupart's ligament on the left side, and the thumb into the corresponding point on the right, and then approximate them. By this grip we can discover what part of the foetus is in relation to the pelvic brim, and whether the latter is occupied by a foetal part or is empty. If the patient is not in labour, and the presenting part fills the pelvic brim, it can only be a vertex (Pinard). If the presenting part is freely moveable we can determine whether it is a head or a breech, exactly as if it was at the fundus. If the patient is in labour and the presenting part is fixed, we feel the outline of the chin or occiput, and the groove of the neck, in the case of the head; while the breech is more irregular, larger, and the lower limbs can be felt near it. The different presentations of the head (vertex, face, brow) can be determined chiefly by noting the relationship in point of height above the pelvic brim, between the occiput, *i. e.* the portion of the cephalic tumour which occupies the pelvis at the same side as that on which the back is, and the chin. If the chin lies higher than the occiput

it is a vertex presentation, if lower it is a face, and if they both lie at the same level it is a brow (v. Fig. 5). These three grips are usually sufficient to tell all that is required. But if the presenting part has sunk deeply into the brim, then the fourth grip is necessary in order to feel it. To practise this grip two hands are required; and, in place of facing the patient's head, turn so as to face her feet. Sink the tips of the fingers of the right hand into the true pelvis at one side, and the tips of the fingers of the left hand similarly at the other side. By this means the extent that the presenting part has descended can be estimated.

To make more obvious the method of palpation, I shall describe a case in which the child is lying in the first vertex position. On making the *fundal grip* a large, tolerably hard, and rounded tumour is felt at the fundus, lying slightly to the right of the middle line, and proceeding from it is felt the back of the child on the left, and perhaps the limbs on the right. There is no groove between the round tumour and the back, and on moving the former it moves *en bloc* with the back. It is thus obviously the breech. By the *umbilical grip* the back is felt on the left, and on moving the hands laterally the greatest resistance is felt upon the same side. By *Pawlic's grip* another hard rounded tumour is felt in the pelvic brim. It is harder than the fundal tumour, and between it and the back is a groove running obliquely—the groove of the neck. This groove, and also the round tumour, lie higher above the pelvic brim upon the right side than upon the left. If the tumour is not fixed it can be moved about—bal-

lotted—independently of the back. These points distinguish it as the head; and the fact that the tumour is higher above the pelvic brim on the right than on the left, shows that the chin is higher than the occiput, and therefore that the vertex is presenting.

The foregoing is the usual manner of performing abdominal palpation; the special features of the different presentations will be dealt with under the presentations.

4. *The presence of pelvic contraction.* This can be determined at term in some cases. I have mentioned the general rule as to the fixity of the presenting head at term in primiparæ and in multiparæ. In the former it is fixed during the last three or four weeks of pregnancy, in the latter it may not fix until the commencement of labour. There are several conditions which tend to prevent the fixation of the head:—

- (1) Contracted pelvis.
- (2) Pendulous abdomen, or obliquity of the uterus.
- (3) Hydramnios.
- (4) Multiple pregnancy.
- (5) Placenta prævia.
- (6) Face or brow presentation.
- (7) Hydrocephalic head.

In most cases (2) to (6) can be excluded, and usually also (7). (1) then alone remains, and it is, especially in primiparæ, by far the commonest cause of non-fixation of the head. If we meet a case in which the head ballottes freely above the brim at a time at which it should be fixed, pelvic contraction is the first condition to be thought of.

5. *If the patient is in labour.* The diagnosis of labour has already been gone into (*v. p. 33*). The important points are, the presence of true pains or

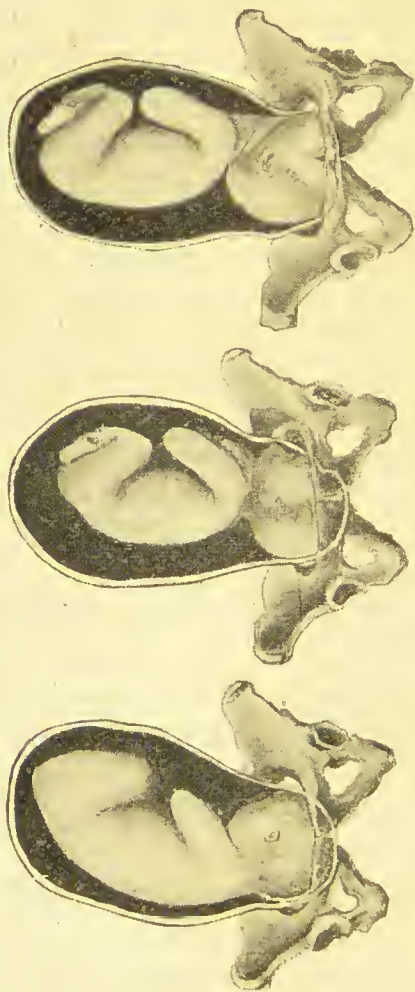


FIG. 5.—Relative position of the chin and occiput in vertex, brow, and face presentations; as ascertained by abdominal palpation (diagrammatic).

of painless contractions, and the fixity or non-fixity of the presenting part in multiparæ.

6. *The course and progress of labour.* The pro-

gress of labour is best determined by noting the descent of the presenting part. In the early stages the height of the chin above the pelvic brim can be measured in finger-breadths. As labour advances the chin approaches the level of the pelvic brim, and then sinks below it. The rate of advance can then be determined by the fourth grip. This is a very much more reliable method of determining the advance of the head than is a vaginal examination. In all cases of delayed labour with strong uterine contractions, the caput succedaneum hourly increases in size and bulges downwards more and more; consequently we may easily be led, when making a vaginal examination, to attribute the diminished distances between the caput and the perinæum to the descent of the presenting part, instead of, as may be the case, to the increasing size of the caput.

7. *The indications of threatened rupture of the uterus.* The indications which can be determined by palpation are as follows:—The rising of the contraction ring upwards into the abdomen. This ring, which marks the line of junction between the contractile upper uterine segment and the non-contractile lower uterine segment, is felt as a depression running across the uterus (*v.* Fig. 44). In normal labour it is not noticed, as it does not rise at all, or only very slightly above the symphysis. In delayed labour, however, the ring is always rising higher into the abdomen, according as the muscle-fibres retract and the upper uterine segment thickens. If this ring rise more than $1\frac{1}{2}$ inches above the symphysis, it constitutes one of the signs of threatened rupture of the uterus, and is an indication for

immediate delivery. It has to be diagnosed from a distended bladder, as the depression which is found above the latter is not unlike the contraction ring. A distended bladder may usually be recognised by obtaining fluctuation in it, and if a catheter be passed the depression disappears. Also the depression at the top of a full bladder lies horizontally, or is circular with the concavity downwards, while the depression over the contraction ring runs obliquely from side to side, as the uterus never retracts uniformly over both sides of the fœtus. The standing out of the round ligaments is another indication of danger. One of them can readily be felt through the abdominal walls as a tense cord. The other is, as a rule, not to be felt, owing to the partial rotation of the uterus round a vertical axis. The character of the uterine contractions is also of importance, and can be determined by palpation. Normally they should be intermittent, but if labour is unduly prolonged they become continuous or tonic.

In certain conditions of the patient it may be impossible to obtain any information from abdominal palpation:—if she will not allow her abdominal muscles to relax; if the liquor amnii has escaped for a long time, and the uterus is contracted down upon the fœtus; or if there is a great excess of liquor amnii—hydramnios.

II. *Vaginal examination*.—The next method of diagnosing the position is *vaginal examination*. By it can be determined:—the nature of the presenting part; the fixity of the presenting part; the condition of the membranes; the degree of obliteration and of dilatation of the cervix; and the presence of a

prolapsed limb or cord. Also, if the presenting part is not fixed, some idea can be obtained as to the size and shape of the pelvis.

The presenting part can be determined by noting its size, shape, and characteristics. A vertex and a breech both feel to be hard, round tumours; but on the vertex, which is more regular in outline, are felt the sutures and fontanelles; on the breech the anus, the tip of the coccyx, and the two tubera ischii. The face at the commencement of labour is very irregular, but when its features are obscured by a large caput succedaneum it also feels smooth and round. It is recognised by feeling the mouth with the tongue and alveolar ridges, and the supra-orbital ridges. A brow is recognised by feeling, on one side of the presenting part the anterior fontanelle, and the smooth frontal bone; and on the other, the supra-orbital ridges, and the edges of the orbital cavity. A foot can be distinguished from a hand by feeling the heel; by noting that the line of the tops of the toes is straight, of the tops of the fingers curved; that the thumb can be apposed and opposed, while the great toe cannot. The knee can be distinguished from the elbow by its greater size; by feeling the patellar ligament and the patella, if the knee is not flexed; and especially by feeling the tuberosity of the tibia.

There are no insuperable difficulties in the way of making a vaginal examination; but, unfortunately, there is an ever-present danger. Very many puerperal women die as a result of septic infection; and, if there were no vaginal examinations, there would be no cases of acute sepsis in

previously healthy women. If then, vaginal examinations could be entirely abolished, or, at any rate, reduced to a minimum, very many lives would be saved. Let us see how far it can be replaced by abdominal palpation.

If the capabilities of both methods are inquired into, it will be seen, that, while many facts can be determined by abdominal palpation which cannot be determined by vaginal examination, there are very few facts which can be determined by vaginal examination alone. What are these exceptions? The most important is the diagnosis of prolapse or presentation of the cord. This certainly, as far as we know at present, cannot be determined by palpation. It is a most important condition to recognise, and, therefore, one vaginal examination, at all events, must be made, except in those cases in which the presenting part was deeply engaged in the pelvis from the commencement of labour, as it is obvious that prolapse could not then occur. The best time to make it is immediately after the rupture of the membranes, as it is then that the cord prolapses. Another point, that can be determined by vaginal examination alone, is the degree of obliteration and dilatation of the cervix. It, however, is not a matter of very vital importance, and usually can be sufficiently nearly ascertained by noting the descent of the presenting part. All this points to the extreme importance of acquiring skill in practising abdominal palpation. If we possess it, the number of vaginal examinations can be very greatly restricted.

III. *Auscultation*.—The third and last method of

diagnosing, or rather of assisting to diagnose, the position, is *auscultation* of the fœtal heart. According to the presentation and position of the fœtus, the heart is heard with maximum intensity over one or other part of the abdomen. Let us imagine the abdomen divided into quarters by one line drawn vertically, and another drawn horizontally, through the umbilicus. Then if the head is in the lower uterine segment, the heart will be heard best below the transverse line; and if the head is in the fundus, above the same line. If the back, in a vertex or breech presentation, is to the left of the vertical line, the heart is best heard to the left of the same line; if to the right of the line, the heart is heard to the right.

CHAPTER VI.

NORMAL LABOUR.

Definition of Normal Labour—Preparations for—Care of Nipples—Obstetric Couch—Obstetrical Armamentarium—Vertex Presentation: Definition, Diagnosis, Mechanism.

Definition.—Normal labour consists in the child presenting by its vertex, in the pains coming on, and following one another, in such a manner, that the child is born, and everything is over without artificial aid, within twenty-four hours. This train of events will happen in about 90 per cent. of all labours. It is very important then, to study the phenomena and management of normal labour, as it is in the management of it that by far the greater number of mistakes are made. Frequently by the ignorance and meddlesomeness of the medical attendant, cases of normal labour are turned into abnormal ones.

Preparation for Labour.—During the last fortnight of pregnancy the patient should be taught to pay particular attention to certain points. She should have warm baths daily; and her bowels should be regulated, so as to avoid the constipation which occurs, especially, towards the end of pregnancy. As soon as premonitory symptoms of labour are noticed, a good purgative must be administered—castor oil (one or two ounces), sulphate of magnesia

(half an ounce), or cascara sagrada (two drachms), followed after one or two hours by an enema. Another enema must be given as soon as labour has well set in.

The due care of the breasts is a most important point, especially in primiparæ. The physician should examine the nipples to ascertain if they are of a shape suited for nursing. If they are at all depressed, the mother must be taught to draw them out gently with her fingers several times a day, taking care not to use undue force, and to have perfectly clean fingers. Too violent attempts at forming the nipple, especially when they are made by an unskilled nurse, often result in causing slight lacerations in the delicate skin. Then, if the fingers or nipples are dirty, the cracks become infected, and mastitis may follow. In addition to forming the nipples, the patient must bathe them a couple of times daily, with some lotion that will harden the skin. Otherwise a strong and healthy child will cause the greatest pain whilst nursing. The best lotion to use is alcohol in some form—eau de Cologne, whisky, or common methylated spirits. Begin with a weak solution and gradually increase the strength. Pure whisky may be used, but eau de Cologne must be diluted by adding an equal volume of water.

In the case of a primipara it is always necessary to instruct her as to what she requires to have in readiness for her delivery. The following list will be found fairly complete:—two mackintoshes, one large enough to completely protect the mattress, the other about one third that size; four binders $1\frac{1}{4}$

yards long, and 18 inches wide; half a dozen packets of sanitary towels; half an ounce of surgical pins; one skein of glazed linen thread; one pound of absorbent gamgee tissue, to use as sponges.

It is also of importance that the physician should know how the obstetric bed is made. In making it we require to combine comfort with cleanliness and convenience. The patient must not be, as our grandmothers were, lost at the bottom of a large feather bed; neither must she be forced to lie on a hard board. A firm and well-made hair mattress will meet every requirement; it should, if possible, have boards beneath it instead of springs. The bed should be about two feet in height. It is made in the following manner, from below upwards:—(1) the mattress; (2) the large mackintosh; (3) an under blanket; (4) a sheet and bolster; (5) the small mackintosh enclosed in the drawsheet; (6) a pillow; (7) a top sheet and the requisite number of blankets. There should be a piece of oil-cloth or mackintosh hanging down as a valance at the side of the bed, in order to protect it.

The other essentials in the room are,—a fire, unless the weather is extremely warm, and it should, if possible, be one on which a kettle can be boiled; a large jug thoroughly scoured inside and outside, to hold about one and a half gallons; a stand of some kind on which it can be placed, and which will raise it about two feet above the patient's bed; two additional jugs, one for cold and one for hot water; four basins if possible, but three are sufficient; an abundant supply of boiling and of cold water.

And now of what must the doctor's armament

consist? I shall give first the things necessary for a perfectly normal case, and then a list of everything that will be required for any operation short of abdominal section. For a perfectly normal case he requires:—

- (1) Corrosive sublimate tabloids.
- (2) A bottle of creolin or lysol.
- (3) A piece of carbolic soap.
- (4) A good nail-brush.
- (5) A metal catheter.
- (6) A Higginson's syringe for administering enemata.
- (7) A bottle of some preparation of ergot.

I particularly omit in this list any mention of a douche for douching the vagina or uterus. In normal labour douching of any kind is unnecessary.

In order to be prepared for any obstetrical emergency except abdominal section, the following in addition are required:—

- (1) A syphon douche and glass nozzle. The best kind consists of a plain rubber tube, about six feet in length, without valves of any kind. At one end it has got a sinker which keeps it immersed in the fluid used; a little further up, the tube is encased in a moveable horseshoe-shaped piece of vulcanite, which fits on the top of the jug and prevents the tube from kinking. Halfway down the tube there is a ball-shaped expansion, and a little further on there may or may not be a tap. It is completed at the other end by a glass nozzle. To use the douche the sinker is immersed in the fluid, and the vulcanite support adapted to the depth of the jug, which is then placed upon the stand. Now compress the

ball with one hand, and having done so squeeze the tube between the nozzle and the ball. By this means when the ball is released water is drawn into it from the jug. This usually is sufficient, and the water will continue to run, upon the principle of a syphon. If it does not, it is only necessary to

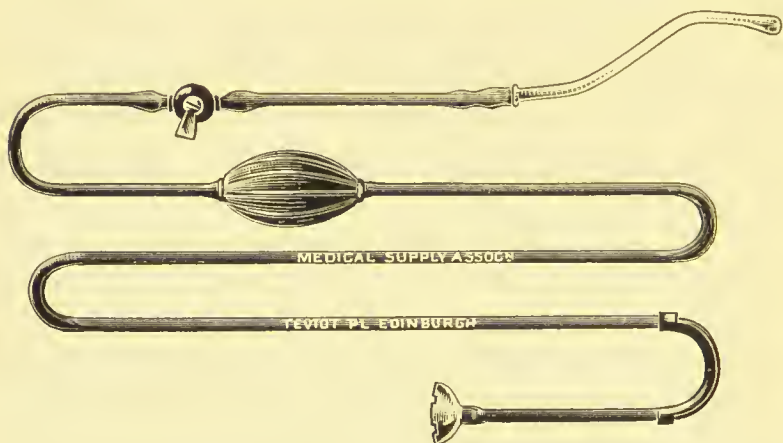


FIG. 6.—Syphon douche, as described in the text.

repeat the previous manipulation a second time.
(v. Fig. 6.)

- (2) An ordinary needle-holder, and a few large and a few small curved needles.
- (3) An axis-traction forceps.
- (4) A silver male catheter, No. 3, for removing mucus from the child's larynx.
- (5) Two Bozemann's uterine catheters, one large and one small.
- (6) A perforator—Naegle's or Simpson's.
- (7) A Braun's blunt hook for decapitation.
- (8) A cranioclast—Braun's or Winter's modification of Auvard's.

- (9) A long and narrow forceps for plugging the uterus.
- (10) Two American bullet forceps.
- (11) A posterior speculum.
- (12) Two or three curettes, including Rheinstädter's.
- (13) Aseptic silk and catgut.
- (14) Chloroform and inhaler.
- (15) Iodoform gauze for plugging.
- (16) A box of absorbent cotton wool for the same purpose.
- (17) Two gum-elastic catheters, Nos. 10—12, to act as porte-fillets or as repositors.
- (18) A hypodermic syringe.
- (19) The following drugs:—opium, ether, sal volatile.

This list may seem to be excessive, and to include more appliances than can be carried in a bag. If the perforation instruments are excluded, as they usually can be, the remainder can with ease be held in an ordinary midwifery bag.

VERTEX PRESENTATION.

Definition.—A vertex presentation is the term applied to that presentation which results when the fœtus lies in its normal attitude with the head lowest, and in which the vertex, or space between the anterior and posterior fontanelles, lies lowest. It occurs in about 93·53 per cent. of all full term cases.

Positions.—Two positions are recognised, each of which may be subdivided into two more. They

are classified according to the relation of the back of the child to the middle line of the mother, and are :—

| | | | | |
|-------------------------------|---|------------------------------------|---|---|
| 1st position—back to the left | { | in front (1st position of Naegele) | | |
| | | behind (4th | „ |) |
| 2nd „ „ „ right | { | in front (2nd „ „) | | |
| | | behind (3rd | „ |) |

The first position with the back in front is very much the most common.

Diagnosis.—*Abdominal Palpation.*—The diagnosis of vertex presentations is best made by this means ; the head is discovered to be lying in the lower uterine segment, and either just above the pelvic brim or engaged in it. The chin lies at a higher level in the uterus than the occiput, thus denoting that the case is one of vertex presentation, and not of brow or face (v. Fig. 5). The breech is at the fundus, and between it and the head lies the body, usually inclined to one or other side. The limbs may or may not be felt, according as the back is posterior or anterior.

Vaginal Examination.—A hard round tumour is found to be presenting, and upon it the sutures and fontanelles can be felt. The anterior fontanelle is recognised by its lozenge-like shape ; the posterior is smaller and triangular. If, however, the bones overlap one another, owing to moulding, the fontanelles may be obliterated. Their site can then be recognised by the fact, that, a number of sutures meet at a point. At the anterior fontanelle, four sutures meet ; at the posterior, three.

Auscultation.—The point of maximum intensity

of the heart-sounds is found to be below the umbilicus, and to one or other side of the middle line according to the side at which the back lies.

Mechanism.—The movements by which the foetus is adapted to the varying diameters of the genital canal can be resolved into five distinct groups:—

- (1) Descent; and, coincidentally,
- (2) Flexion.
- (3) Internal rotation.
- (4) Extension.
- (5) External rotation.

(1) *Descent*.—As the uterus contracts, the presenting head is driven down into the brim of the pelvis. It enters the latter in such a manner, that its bi-parietal diameter is parallel to one or other of the oblique diameters of the pelvis, according to the position in which the child lies. In describing the mechanism of labour here, I shall suppose that the foetus lies in the first position with the back anterior. In that position the head enters the brim with its bi-parietal diameter parallel to the left oblique diameter of the brim. When the head first presents at the brim, it is in a position of unstable equilibrium. As it is driven down by the contractions of the uterus, it is obliged to assume a position of stable equilibrium—that is, it must either flex or extend.

(2) Of the two alternatives which I have mentioned, *flexion* occurs in more than 99 per cent. of all cases of head presentation. Why should it occur so very much more frequently than extension? Let us imagine the case of a rod A which is fixed by a moveable joint C on to another rod B (*v.* Fig. 7).

Now, if the joint C is situated in the centre of A, equal resistance offered to the descent of the ends of A, as B and consequently A itself are driven downwards, will not cause A to change its position as regards B. But if the joint C is nearer one end of A than the other, then equal resistance offered to the descent of the ends of A will cause the long arm to approach B, the short arm to rotate in the opposite direction. Furthermore if we imagine A to be

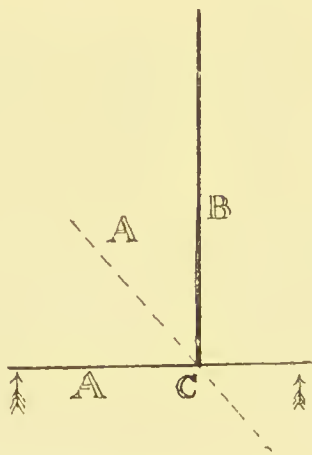


FIG. 7.—Diagram showing how flexion is produced.

not a line but a surface, it is obvious at once, that, if the extent of surface in front of C is greater than the extent behind it, the resistance to the descent of the anterior surface will be greater than the resistance to the posterior surface. In other words the greater surface will tend to approach B in consequence of the less opposed surface descending more rapidly. And this is practically what occurs to the head as it enters the brim. The head is pivoted on the axial line (B) of the curled up, and

consequently rigid, foetal body in such a manner that its occipito-frontal diameter is represented by the line A. The resistance of the brim is equal on both ends of this diameter, with the result that the head moves so as to cause the chin to approximate the chest. Again, inasmuch as the extent of the surface of the head, which meets with resistance in its descent, is very much greater in front of than behind the pivotal point, the tendency for flexion to occur is greatly increased. In this way flexion commences, and continues until the head comes into a position of stable equilibrium, with the chin resting upon the chest.

There are other explanations of the occurrence of flexion, but the foregoing is the theory usually accepted. The result of flexion is that a shorter diameter of the head is substituted for a longer one. When the head is flexed the longest diameter which has to pass through the brim is the sub-occipito-bregmatic. Before flexion occurred the presenting diameter was the occipito-frontal, and so a diameter of $3\frac{3}{4}$ inches has been substituted for one of $4\frac{1}{2}$ inches.

(3) *Internal Rotation*.—When flexion has occurred, the head is advancing with its vertex presenting, and its sub-occipito-bregmatic diameter lying in the right oblique diameter of the pelvis. It continues in this diameter until the presenting part reaches the pelvic floor; when the occurrence of internal rotation of the head brings the sub-occipito-bregmatic diameter to lie in the conjugate diameter of the pelvis. This internal rotation is brought about by two factors. The first is the

inclination of the pelvic floor. I have already described the anterior inclined planes of the pelvis; they slope downwards and forwards, so that whatever impinges first upon them is guided to the front. The second factor is, that, the point of least resistance to the advance of the occiput lies in front. Posteriorly there is the resistance offered by the firm vaginal walls and perinæum; anteriorly there is the arch of the pubes, under which there is a minimum of resistance. The fact that it is always the lowest portion of the head which rotates forward, favours both these theories. Accordingly the agents which tend to cause forward rotation of the occiput are :—

(1) Flexion, which brings the occiput lowest.

(2) Good labour pains, which drive the presenting part onward.

(3) A firm perinæum, which, by causing a maximum of resistance posteriorly, compels the occiput to turn in the direction of least resistance (Lusk).

Extension.—When internal rotation is completed the head is lying so that its sub-occipito-bregmatic diameter corresponds approximately to the antero-posterior diameter of the outlet, and the occipital bone is under the pubic arch. Now the advancing head has to travel in a different direction from that in which it started, in order to suit itself to the forward curve of the genital canal. During the movements of internal rotation, the head has been commencing to adapt itself to this curve, and now it advances along it, and at the same time delivers itself, by the movement of extension. In this stage the occiput of the child becomes fixed beneath the pubic arch,

and the head, as it extends, rotates round this fixed point, in such a manner that the chin leaves the chest, and the face slowly appears from behind the perinæum. The factors in the extension of the head are two:—first, the fact that the area of least resistance lies in front, and that the head must extend in order to travel in this direction; and secondly, the contractions of the levator ani muscle. This muscle is so situated that it forms part of the floor of the pelvis, and of the postero-lateral walls of the vagina. When uncontracted its anterior surface is concave; when contracted it tends to become flat, and so tends to push forward anything which may be lying upon it. Just previous to extension, the forehead of the child lies in the concavity of this muscle; accordingly, as the muscle contracts, it forces the forehead forwards. Thus extension of the head is brought about, and by the time it is completed, the chin has appeared from behind the perinæum, *i. e.* the head is born.

External Rotation.—This is the final movement of the head. It consists of two parts—(1) restitution, (2) external rotation. When the movement of internal rotation occurs, the head rotates to suit the pelvis, but the shoulders do not take part in this movement as they have not as yet reached that portion of the pelvis which enforces their rotation. Thus the head becomes slightly twisted as regards the shoulders. This position continues so long as the head is subjected to the pressure of the pelvis. As soon as the head is freed from this pressure, its first movement is to rotate, so as to lie in its normal relationship to the shoulders, *i. e.* restitution occurs.

As the head travelled through the pelvis, the shoulders became engaged in the brim in the diameter at right angles to that in which the head engaged. Thus, in a first position, the shoulders engaged in the left oblique diameter of the pelvis. As they descend, the anterior shoulder, being slightly lower than the posterior one, rotates in front, so as to lie in the antero-posterior diameter of the pelvis. It is this movement that causes the completion of external rotation, the already delivered head rotating to suit the new position of the shoulders. Usually the head rotates in such a manner as to return to its former position; *i. e.* in a first position, it rotates with the occiput pointing to the mother's left thigh; in a second position, with the occiput pointing towards the right thigh.

When the anterior shoulder has rotated in front, it becomes fixed under the pubic arch. The posterior shoulder then sweeps over the perinæum, and is born. The arms follow, folded upon the chest; and the rest of the body, being smaller than that which has gone before, is born without further difficulty. It is interesting to note that these different movements are, so to speak, complementary to one another. Thus first occurs flexion of the head; then internal rotation; then extension, the complement of flexion; then external rotation, the complement of internal rotation.

In the first position with the back posterior (fourth position of Naegele), the mechanism of delivery is the same as the foregoing with the single exception that during internal rotation the head rotates through three eighths of a circle instead

of through one eighth. This is due of course to the fact that the occiput has to travel to the front from the posterior end of the left oblique diameter, instead of from the anterior end of the right.

In the second position with the back anterior the head engages with its sub-occipito-bregmatic diameter in the left oblique diameter of the pelvis. Flexion, internal rotation, and extension occur as before. The shoulders engage in the left oblique diameter of the pelvis, and, as a consequence of the anterior rotation of the shoulder, during external rotation the occiput turns towards the mother's right thigh.

In the second position with the back posterior (third position of Naegele), the only difference from the same position with the occiput anterior lies in internal rotation taking place through three eighths of a circle instead of one eighth.

CHAPTER VII.

NORMAL LABOUR (*continued*).

Treatment of Normal Labour, First Stage, Second Stage—Methods of preserving the Perinæum—Care of the Funis after the Birth of the Head—Management of the Third Stage—Ligation of the Cord—Expulsion of the Placenta—"The Dublin Method"—Method of determining whether the Placenta is in the Uterus or in the Vagina—Ergot—Anæsthesia—Abnormal Mechanism in Vertex Presentations.

Treatment.—The treatment of the three stages must be considered separately.

First Stage.—The first stage commences with the onset of labour pains, and ends with the full dilatation of the os and the rupture of the membranes. Its chief physiological phenomenon is the occurrence of intermittent contractions of the uterus, which tend to drive the ovum into, and so to dilate, the cervical canal. The management consists in keeping up the patient's strength, in helping nature in a natural way, and in avoiding meddlesome and dangerous interference.

Concerning the first of these it is unnecessary to say much. The patient must get easily digested food at short intervals, and anything likely to derange the stomach must be avoided. At the commencement of labour, when the pains are few and far between, she should have some occupation

which will keep her mind off her condition, and so prevent useless fretting.

The second indication—to help nature in a natural way—is easily carried out. We can help nature to dilate the cervix, by keeping the woman in such a position that the action of gravity aids the pains in driving the ovum downwards against the os; in other words, by allowing the patient to walk about or sit in a chair, and not compelling her to remain in bed. Indeed, nature herself will prompt her to maintain an upright posture. Moreover, the uterus must be in such a position that its contractions can act to the greatest advantage. If the abdomen is pendulous, or if any degree of lateral obliquity of the uterus is present, the contractions will drive the head, not into the pelvic cavity, but against the brim. This obliquity, or anteversion, of the uterus is best corrected by tightly applying an abdominal belt or binder, so as to keep the uterus in a proper position; also by making the patient lie on the side to which the head is deflected, or upon her back in case of marked anteversion. Another important point is to remove all obstruction to the descent of the head. In a normal case the only obstructions present are a full bladder, or a loaded rectum. To avoid the former, the patient must be made to pass water frequently; or, if necessary, a catheter must be passed. To insure that the rectum is empty during the second stage, a purgative should be given as soon as the premonitory symptoms of labour appear, followed in a few hours by a soap-and-water enema. It is well to repeat the latter as soon as the patient

gets into the second stage, to avoid the soiling caused by fæces being forced out by the descending head. It is useless to endeavour to get the patient to "bear down," *i. e.* to voluntarily contract her abdominal muscles, during the first stage. As soon as voluntary efforts have any effect, that is, as soon as the os is dilated, she will "bear down" of her own accord. Premature efforts only waste her strength, and make but slight impression upon the cervix, inasmuch as they tend to drive the entire uterus and its contents into the pelvis, and not to force the ovum against the cervix. Indeed, by the absence, or presence, of voluntary bearing-down efforts, we can tell whether the patient is in the first or second stage, without making any vaginal examination.

The third indication is to avoid meddlesome and dangerous interference. This includes superfluous vaginal examinations; manual or instrumental dilatation of the os; the application of the forceps, when it is not only unnecessary, but contra-indicated; and prophylactic vaginal douching, when it is not required (*v.* page 5). I have already spoken of the advantages of abdominal palpation over vaginal examination, and of the dangers of the latter. One vaginal examination, however, is necessary, in order to determine if the cord is presenting or prolapsed. It should be made, if possible, just after the membranes have ruptured. In cases in which the head has been fixed for some time before labour, even this examination is unnecessary.

Second Stage.—The second stage commences with the full dilatation of the os, and ends with the birth

of the child. Its chief physiological phenomena are the continuance of the involuntary and intermittent uterine contractions, with the added help of voluntary contractions of the abdominal muscles, the diaphragm, and, indeed, of most of the muscles of the body. The result of these contractions is :— first, that the membranes rupture, having lost the support of the cervix ; and, secondly, that the foetus advances downwards through the vagina, presses on and dilates the perinæum, and finally is born. The indications for the management of the case are the same as before, until the head appears at the vulva. As, however, the physiological phenomena have changed, so the manner of carrying out the indications changes also ; and we endeavour to help nature in a different way from the method adopted in the first stage. As the os is fully dilated, and as voluntary “bearing-down” efforts are now occurring, we must put the patient in such a position that she can make the most use of her strength. This she can best do in bed. Let the patient lie on her side, with her feet against the end of the bed, and give her something on which she can pull. A towel tied to the foot of the bed is best, as, by pulling on it, she can counterbalance the force with which she is straining against the end of the bed. At the same time encourage her to hold her breath during a pain, and to “bear down” with all her strength.

As soon as the head appears at the vulva, the treatment becomes more active ; and the obstetrician prepares for the immediate delivery of the patient. Now, the chief indication is to avoid

rupture of the perinæum, and we must place the patient in the best position for attaining this end. There are two positions from which to choose:—the patient may lie either upon her left side or upon her back. Of these the first is by far the more preferable. It is cleaner, the progress of the head can be more satisfactorily watched, and more effectual measures can be taken for the preservation of the perinæum. Having the patient, then, in the side position, what method shall we adopt to prevent the occurrence of perinæal laceration? Two chief methods have been proposed; the direct and the indirect. The direct method consists in directly supporting the perinæum with the hand, with the object of preventing it from becoming over-distended, and so lacerated. It consists in laying the palm of the hand on the perinæum, with the concavity between the first finger and thumb directed so as to enclose the posterior end of the vulva, and so preventing the perinæum from being forced downwards by the advancing head, and at the same time directing the pressure so as to push the head forwards beneath the pubic arch. The indirect method consists in endeavouring to push the head forward as much as possible without any attempt being made to support the perinæum. This can be done either by introducing two fingers into the rectum, or, better still, by applying the hand behind the anus, and pushing the head forward. I shall describe this last in full, as I consider it the best of all methods for the preservation of the perinæum. To understand it fully, it is a help to study the accompanying diagram (*v.* Fig. 8).

The rod A B represents the foetal body which is being driven downwards by the uterine contractions in the direction shown by the arrow C. This direction causes the head to press upon the perinæum H. If the end A of the rod can be pushed forwards towards A' then the uterine contractions will drive the rod in the direction shown by the arrow C', that is through the vulva. Accordingly, any pressure applied in the direction of the arrow H will take a

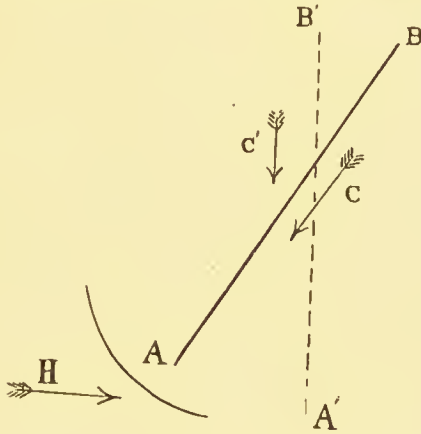


FIG. 8.

proportionate amount of pressure off the perinæum. One point must be remembered:—the parturient canal is in the shape of a curve, with the concavity forwards. This curve may be considered as consisting of an upper segment and a lower segment. While the foetus is advancing in the upper segment of the curve, it is being driven in the direction of a point midway between the anus and the tip of the coccyx. As it comes into the lower segment it changes its direction, and moves towards the vulva. If forward pressure is applied to the advancing

head, while it is still in the upper segment of the curve, such pressure will drive it back into the uterus. If, however, we wait until the head gets into the lower segment, then, our forward pressure will push the head off the perinæum and in the direction of the vulva. Accordingly this pressure can only be of use when the head has passed the "sticking point," if I may call it so,—that is the point of junction of the two portions of the parturient curve. This is the theory of the method; it is carried out as follows:—The patient is in the side position, with her buttocks well over the edge of the bed. The physician stands by its side facing its foot, and passes his left hand over the patient's hips, and then between the thighs from the front. With this hand he endeavours to draw forward the advancing head by applying the fingers to the scalp and attempting to draw it forwards. Of course this cannot be done, effectually, until the head is sufficiently advanced to be able to get some purchase upon it with the fingers. Meanwhile, the right hand is idle, waiting until the head is sufficiently low for forward pressure to be of avail. Then the heel of the hand is applied between the anus and the tip of the coccyx, and the head pushed forward and delivered at a suitable moment, *i. e.* between the pains. There are two essential details, the due observance of which tends greatly to aid in the preservation of the perinæum. First, the head must not be allowed to extend too soon. Extension should be delayed until the lowest possible point of the occiput comes to lie under the symphysis; as the nearer to the neck the point of the

occiput is, round which the head rotates, the smaller will be the sagittal diameter of the head, that will distend the perinæum. This is carried out by pressing the forehead and face forward, in such a manner as to keep the chin, at the same time, in contact with the chest. The exact method of doing this, as well as the knowledge that the head is past the "sticking point," can only be attained by experience. The second essential is to deliver the head between the pains, and not during a pain. This is done by trying to check the voluntary efforts of the woman at expulsion ; by making her cry out instead of holding her breath ; and by taking away the support for her feet, and any towel or rope upon which she may be pulling. Then, when the pain has passed off, the head may be pressed out as already mentioned.

The moment the head is born, we must determine whether the cord is twisted round the neck or not. This is done by passing a finger or two into the vagina, and feeling carefully round the neck and upwards as far as the shoulder. If the cord is there, it is readily felt, and must be immediately set free. The danger of leaving it is, that, if it is a short cord, or if it is several times round the neck, it may not be sufficiently long to permit of the birth of the child without the detachment of the placenta. It can be set free in any of three ways. The usual and easiest method is to pull down a loop of it, and pass this loop over the head of the child ; if there is a second turn round the neck, it must be pulled down and set free in the same manner. If the cord is drawn so tightly round the neck, that it

cannot be slipped over the head, we try to slip it over the shoulders. To do this firm pressure is applied to the fundus, and the child driven downwards; as it advances the cord is slipped, first, over one shoulder, and then over the other, and so the child is expelled through the loop of the cord. If neither of these methods can be performed, owing to the excessive tightness of the cord, divide the latter with scissors, and deliver the child instantly, by means of pressure upon the fundus, and traction upon the head. While the cord is being set free, the nurse should wipe carefully the eyes of the child, to remove any discharge that may have got into them during the passage of the head through the vagina. This is an important prophylactic measure in the treatment of the purulent ophthalmia of infants. When the cord has been set free, the remainder of the delivery may be left to nature, provided that the cord is still pulsating; if not, the child must be instantly delivered. In accomplishing this, avoid undue or premature traction on the head, as it may hinder rotation. *Vis a tergo* is much to be preferred to *vis a fronte*. That is, press upon the fundus, and, as the shoulders come down, lift the child upwards towards the mother's abdomen, so as to allow the posterior shoulder to sweep over the perinæum. Then depress the body again slightly, in order to bring the anterior shoulder from beneath the symphysis. Once the shoulders are born the rest of the child quickly follows, as it is smaller than the part which has gone before.

In a normal case the child will begin to cry as soon as it is born; if not, any slight cutaneous

stimulation will cause it to do so. If there is mucus in the throat, it must be cleared out *before* attempting to make the child inspire. Then a dash of cold water or a couple of smart slaps of the hand, are the time-honoured methods. Lastly, the cord has to be tied, and the child thus separated from the placenta.

Formerly, it was a subject of great dispute, whether the cord should be tied the moment the child had cried, or whether the application of the ligatures should be deferred until the cord has ceased to pulsate;—that is, early *versus* late ligation of the cord. According to Budin's experiments, the child receives an additional three ounces of blood by adopting late ligation;—that is, early ligation deprives it of a corresponding amount. It is obvious that the child receives this blood from the placental vessels. But how does it receive it, and is it to its advantage that it should do so? It may obtain the extra blood in two ways. Either the contractions of the uterus compressing the placenta may drive the blood, from the latter, into the child's vessels; or, the first inspiration of the child, by opening up the pulmonary circulation, may create a negative pressure in the great vessels near the heart, and so may cause blood to be aspirated from the placenta. As Lusk points out, it is of practical importance which of these alternatives is the correct one. If the blood is forced in by the contractions of the uterus, the amount thus acquired may be in excess of the requirement of the child, and so may be directly harmful to it. If, on the other hand, the influx of blood is due to thoracic

aspiration, then the placental blood is going to supply a distinct want on the part of the child; and the loss of it is absolutely injurious. The result of experimental research is to prove, that the latter alternative is the more likely; and, furthermore, children in whose case late ligation of the cord has been adopted, are more vigorous and regain their original weight more rapidly than those in whose case early ligation has been performed. The cord, therefore, should not be ligatured until it has ceased to pulsate. It is then tied with a double ligature, one applied two inches from the umbilicus of the child, and the other as close as possible to the vulva. Before applying the second ligature draw gently on the cord so as to pull out any loops that may be lying in the vagina; the object of this will be explained presently. The cord is then divided half an inch above the first ligature, and the child taken away.

Third Stage.—The indication for treatment in the third stage is to promote contractions of the uterus, in order to cause expulsion of the placenta, and of any clots that may be present, and to prevent hæmorrhage, or the admission of air into the uterine cavity. With these objects in view, we turn the patient on her back the moment the child is born, and lay the hand upon the fundus of the uterus. This hand must be so applied as to cover the entire fundus. It thus “controls” the uterus—noting the occurrence or cessation of the uterine contractions, and during the latter preventing the accumulation of blood in the cavity by exerting firm pressure. If the hand is laid only upon the anterior surface

of the uterus, especially the lower part of it, we are apt to stimulate this portion to contract, thus causing irregular contractions, or the so-called hour-glass contraction. . A good method of applying the hand is to sink it with its ulnar border downwards into the abdomen, until it touches the promontory of the sacrum. Then the entire fundus lies in the concavity of the hand, and it is impossible for it to become distended with blood without our knowledge. Having the uterus under control, the placenta must next be considered. Two questions may be asked with regard to its delivery. First, how can it be delivered? Secondly, when should it be delivered?

How can the placenta be delivered? It can be delivered:—

- (1) By the natural efforts of the patient.
- (2) By the Dublin method¹ of expression from above.
- (3) By passing the hand into the uterus, and taking it away.
- (4) By pulling upon the cord, and thus dragging it out.

(1) As the uterus contracts down after the birth of the child the placental site becomes very greatly reduced in size, so that it is no longer large enough for the placenta. The latter, being too dense to be crumpled up, so as to suit its reduced area of attachment, becomes detached, and lies loose in the uterus. Then after several contractions it is ex-

¹ This method is also known as "Credé's method." It was, however, practised in the Rotunda Hospital, and described by M'Clintock and Hardy in their 'Practical Observations on Midwifery' (1848), several years before Credé taught its use (1853). (*Vide* also Barnes' 'Obstetric Operations,' 3rd edition, p. 522.)

pelled into the vagina. If the case is left entirely to nature, it lies there for some time, and is gradually worked downwards, helped by any contractions of the abdominal muscles that may occur. This is a tedious process, and lasts on an average two or three hours.

It is thus seen that there are two periods in the delivery of the placenta :—

First period, including the detachment and expulsion of the placenta from the uterus.

Second period, including the expulsion of the placenta from the vagina.

(2) Expression by the Dublin method during the first period of placental delivery will materially shorten the third stage. It is, however, very liable to cause post-partum hæmorrhage, as the uterine fibres will not have had time to retract properly, and so to obliterate the vessels; also small portions of placenta are frequently left behind. If, however, expression is delayed until the second or vaginal period of placental delivery, then the Dublin method of expression is a most important mode of treatment, and a perfectly safe one.

(3) There are the same objections to manual removal during the first period of placental delivery as to expression; with the added objection that the risk of sepsis is very much increased. When the second period has commenced, manual removal has no advantage over expression, but rather many obvious disadvantages.

(4) Traction on the cord is the worst of all methods of removing a placenta during the first period of its delivery. As the cord is inserted into

the centre of the placenta, traction causes detachment of the latter, at first, in the centre. A cavity is thus formed behind the placenta, into which blood is sucked as the cord is pulled upon. This in itself is of no great consequence so long as the amount of blood lost is small. If, however, the further delivery of the placenta is delayed for any cause, such as dense adhesions between its remaining undetached portion and the uterus, the amount of hæmorrhage may become very serious. Again, if the adhesions between the uterus and placenta are so dense as to prevent separation, strong traction on the cord may cause inversion of the uterus in cases of fundal insertion of the placenta. If the second period of placental delivery has commenced, then traction on the cord may be employed to complete delivery. It has, however, no advantages over expression.

The safest and best treatment, then, is to leave the management of the first period of placental delivery to nature. As soon as the second period has commenced, it can be expedited most safely by adopting expression, as in the Dublin method.

The foregoing also answers the second question, *when should the placenta be delivered?* The placenta should be delivered as soon as it has left the uterus, *i. e.* as soon as the second period of its delivery has commenced. Premature delivery exposes the patient to the danger of post-partum hæmorrhage, and subsequent sapræmic trouble by favouring the retention of fragments. Leaving the entire process to nature, means keeping the patient from the rest she requires, for a much longer period than is necessary.

How is it possible to tell when the placenta has left the uterus? There are four indications:—

(1) *The cord lengthens.* When the cord is being tied two ligatures are used,—one close to the umbilicus of the child, the other as close as possible to the vulva of the mother, having first pulled upon the cord slightly, to withdraw any portion of it which may be coiled up in the vagina (*v.* Fig. 9).

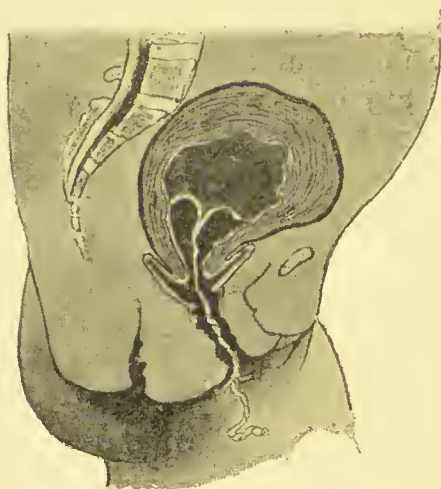


FIG. 9.—Semi-diagrammatic representation of the condition of the parts before the expulsion of the placenta from the uterus.

As the placenta leaves the uterus and comes into the vagina it is obvious that the portion of cord outside the vulva will be increased in length; and so the ligature, which originally was tied as close to the vulva as possible, will come to lie four to six inches away from it (*v.* Fig. 10).

(2) *The fundus rises upwards almost to the level of the umbilicus.* When the child is born the portion of the uterus above the contraction ring sinks into

the thinned out lower uterine segment and vagina, under the pressure of the abdominal muscles and the controlling hand of the assistant (*v.* Fig. 9). As the placenta is expelled from above the contraction ring it comes to occupy the place where the upper part of the uterus had been; and, consequently, the latter is pushed upwards out of the pelvis, and the



FIG. 10.—Semi-diagrammatic representation of the condition of the parts after the placenta has been expelled into the vagina.

fundus is felt almost at the level of the umbilicus (*v.* Fig. 10).

(3) *The mobility of the uterus is increased.* When the uterus is lying in the pelvic cavity with the placenta inside it, it is supported on all sides by the pelvic brim, and cannot readily be moved from side to side (*v.* Fig. 9). But, as it rises, it loses this support, and becomes balanced—if I may use the term—on the top of the placenta, and so can be

moved about with ease from side to side. This is well shown in the diagram (v. Fig. 10).

(4) *The abdominal wall bulges forward, above the pubes.* This is due to the presence of the placenta in the vagina, or in the lower uterine segment. The placenta lying there pushes forward the anterior vaginal wall, and in front of it the bladder and the abdominal wall, and thus causes an appearance resembling a full bladder.

As soon as we know by these signs that the uterus is empty, the placenta may be expressed by the Dublin method. To do this, grasp the fundus with one or both hands during a pain, and press it downwards and backwards in the direction of the last piece of the sacrum. By this means the uterus is pressed down into the vagina, and the placenta driven out before it. The latter is immediately supported by the hands of the nurse, and twisted round several times, so as to cause the membranes to become detached; they are thus brought away entire.

Let me repeat the management of the third stage in a few words. The moment the child is born the patient is turned on her back, and the doctor or nurse "controls" the fundus with one hand. As soon as the cord has ceased pulsating, it is ligatured as described above, and the child is removed. If the bladder is full it ought to be emptied, as pressure applied over a distended bladder causes an unnecessary amount of pain. Nothing further is done until the placenta has left the uterus. As soon as this occurs the placenta is expressed from the vagina, seized in the hands, and twisted round, so as to bring away the membranes entire. The third stage is thus com-

pleted, and nothing remains but to wash all blood off the patient and to apply a diaper wrung out of corrosive sublimate to the vulva and a tight abdominal binder. During all this time the hand must be kept on the fundus, in order to prevent the latter from becoming full of clots. It should not be removed until the last pin of the binder is inserted.

Ergot.—The knowledge of the use of ergot is of great importance. It is undoubtedly of service at certain times, but given at the wrong time it is most dangerous. Its action is to cause tonic contraction of the entire uterus. Considerable importance must be attached to the fact, that the contractions due to the action of ergot are tonic and not intermittent; and that, as such, they differ from the physiological contractions of the uterus. This fact indicates the time at which ergot may be given. It may be given, when tonic contraction of the uterus is not dangerous to mother or child; and with few exceptions, this is only when the uterus is empty. If ergot is given during the first stage of labour, it will delay the dilatation of the os, and cause dangerous pressure upon the child. In the second stage ergot is dangerous, unless it is absolutely certain that there is no obstacle to the rapid birth of the child. This excludes its use in most cases. In the third stage it is also contra-indicated, as it may cause incarceration of the placenta. Then, if hæmorrhage occurs, the condition of affairs is very serious. Hæmorrhage, occurring during the third stage, usually requires the removal of the placenta; but, if ergot has been given, the cervix will be so tightly contracted that it may be impossible to do so. When,

therefore, may ergot be used? It may be used when the uterus is empty, in order to promote tonic contraction, and it is in very few cases that it is advisable to use it during any of the three stages of labour. It may be given as a routine treatment as soon as the placenta comes into the vagina, or even a little sooner, if we are prepared to take away the placenta before the ergot commences to act. Ergot, given by the mouth, causes uterine contractions in from ten to fifteen minutes. Considerably the most reliable preparation is that known as Squibbs' liquid extract of ergot. The Pharmacopœial dose—up to forty minims—is practically useless; the usual dose is one drachm, but from three to four drachms may be given with perfect safety. Ergot, given hypodermically, acts in five minutes, or even less. Up to one twenty-fifth of a grain of the citrate of ergotin may be given.

Anæsthesia.—I think that I may assume that the objections to anæsthesia during labour on moral grounds have long been completely swept away. The objections on the ground of danger are not sufficiently frequently realised to make them at all commensurate to the enormous relief to suffering which is obtained by the use of anæsthetics. It may, then, be assumed that the use of an anæsthetic during labour will frequently be required. The degree of anæsthesia that it is necessary to produce will not always be the same. Two classes of cases are met with—those in which anæsthesia is induced solely to relieve pain, and those in which, in addition to relieving pain, it is necessary to have the abdominal walls, &c., thoroughly relaxed in order to per-

form some operation ; that is to say, there are two degrees of anæsthesia employed during labour :—

(1) Partial or so-called “obstetrical” anæsthesia.

(2) Complete or surgical anæsthesia.

(1) *Obstetrical anæsthesia* may be adopted in all labour cases with the object of relieving pain. It

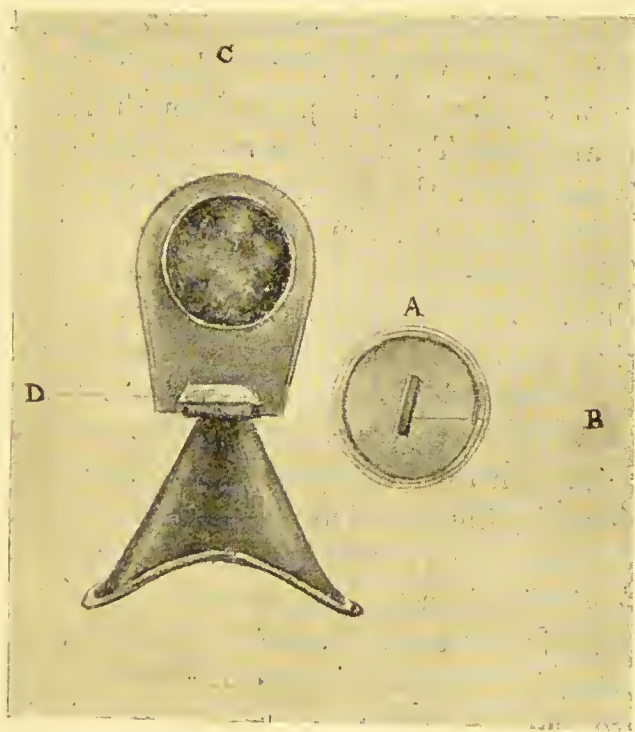


FIG. 11.—Murphy's inhaler. A. Metal cap with inspiratory valve B. C. Chloroform chamber. D. Expiratory valve.

does not tend to asphyxiate the child unless unduly prolonged—more than four hours (Dührssen),—to check labour pains, nor to favour the occurrence of post-partum hæmorrhage. On the contrary, many

patients who will not "bear-down," owing to a dread of increasing the pain, will do so when "obstetrically" anæsthetised. The best anæsthetic for the purpose is undoubtedly chloroform, and one of the best means of administering it is by "Murphy's inhaler" (*v.* Fig. 11). This inhaler is made of metal, and consists of a chamber containing a sponge, on which the chloroform is poured, and a face-piece, either solely oral or, better, oro-nasal. There are two valves, usually made of rubber, which only allow *inspirations* to pass through the chloroform chamber. To use it, a teaspoonful of chloroform is placed on the sponge, and the cap applied. The patient is then given the inhaler to hold, and shown how to put it to her mouth and breathe through it. She does this when a pain is commencing, with the result that she becomes semi-unconscious, and allows the inhaler to fall. Then, as consciousness returns, she again breathes through it, and so on. In this way a sufficient degree of anæsthesia is maintained, and at the same time the doctor and nurse can, if necessary, attend to other things. Anæsthesia should not be commenced until the patient has passed into the second stage of labour.

(2) *Surgical anæsthesia* is necessary in order to facilitate the performance of many obstetrical operations. Chloroform is again the most suitable anæsthetic, as it is most easily administered. If there are any grave contra-indications to its use, ether, of course, must be substituted. The easiest mode of administering it is on a Skinner's mask, or on a pocket handkerchief. Chloroform must never be administered in the immediate neighbourhood of a candle or

lamp, as such light decomposes it into chlorine gas and hydrochloric acid. Inhalation of these may set up a most serious pneumonia (Zweifel).

Abnormal Mechanism in Vertex Presentations.—Persistent Occipito-posterior Position.—In some cases of vertex presentation the forehead, and not the occiput, rotates to the front. This movement is due to incomplete flexion of the head, which causes the forehead to lie at a lower level than the occiput. Then, following the rule that the part of the child which first comes on to the pelvic floor rotates in front, the forward rotation of the forehead occurs. The result of this condition is, that labour is very much more tedious than is usual, and during the birth of the head the perinæum is over-distended and frequently lacerated.

Treatment.—The patient should lie upon the side at which the occiput is, as this favours its anterior rotation. The application of the forceps should be avoided if possible; they should only be applied when an absolute indication for their use occurs (*v.* page 307).

Anterior Fontanelle Presentation.—By this is meant that instead of the vertex of the fœtus presenting, the anterior fontanelle lies lowest. It is met with in flat pelvis, when it is part of the ordinary mechanism (*v.* page 253).

Posterior Fontanelle Presentation.—In this presentation, instead of the vertex, the posterior fontanelle lies lowest, *i. e.* the head is over-flexed. It is part of the ordinary mechanism in cases of generally contracted pelvis (*v.* page 253).

Anterior Parietal Presentation.—This is another term for Naegele's obliquity or posterior asynclitism of the head. The latter rotates on its antero-posterior diameter, so that the sagittal suture approaches the promontory, and the anterior parietal bone lies lowest. It occurs chiefly in flat pelvis (*v.* page 253) also in pendulous abdomen.

Posterior Parietal Presentation.—This is the term for a reversed Naegele's obliquity or anterior asynclitism of the head. The sagittal suture approaches the symphysis, and the posterior parietal bone lies lowest. It is said to occur sometimes in flat pelvis instead of Naegele's obliquity, and is a sign of bad import. It also occurs in cases in which apparently the pelvis and head are normal. In such cases the treatment indicated is podalic version.

CHAPTER VIII.

NATURAL PRESENTATIONS.

Pelvic Presentations: Frequency—Ætiology—Positions—Mechanism—Diagnosis—Result of the Head not filling the Lower Uterine Segment—Treatment—Method of bringing down an Extended Arm—Methods of delivering the After-coming Head; a modification of the Prague Method, Martin's Method, Smellie's Method—Prognosis—Abnormal Mechanism in Pelvic Presentations—Face Presentations: Frequency—Ætiology—Positions—Mechanism—Diagnosis—Treatment—Abnormal Mechanism in Face Presentations.

NATURAL presentations are those presentations which can deliver themselves without the presentation changing, with the exception of vertex presentation, which is known as normal presentation. Under the term natural presentation are included pelvic and face presentations.

PELVIC PRESENTATIONS.

Pelvic presentations include all cases in which the lower pole of the fœtus presents. They are subdivided into:—

1. Complete pelvic presentations, in which the breech and feet descend together.
2. Incomplete pelvic presentations, in which:—
 - (1) The breech descends first alone, the legs being directed straight upwards along the body of the fœtus.

(2) One or both knees descend first.

(3) One or both feet descend first.

The proportion of cases in which pelvic presentations occur varies from 1 in 80 in primiparæ, to 1 in 23 in multiparæ; knee presentations occur about once in 800 births. In considering the mechanism no difference need be made between complete and incomplete presentations.

Ætiology.—I have mentioned before the causes of head presentations, namely:—the uterus is of an ovoid shape, and the foetus in its usual attitude is also of an ovoid shape; the fundus is the larger pole of the uterus, and the podalic pole is the larger pole of the child. Accordingly, in normal cases the breech is to be found at the fundus, and the head at the pelvic brim. Anything, therefore, which tends to change the shape of the uterus, or of the child, may be put down as a cause of mal-presentation, and especially of breech presentations. The principal of these causes are:—

(1) *Multiparous uterus.* The uterine walls have become lax.

(2) *Contracted pelvis.* The uterus is pushed upwards out of the pelvis, and so its shape is altered, owing to loss of support.

(3) *Twins.* The uterus is over-distended.

(4) *Hydramnios.* The uterus is also over-distended.

(5) *Placenta prævia.* The placenta fills up the lower uterine segment, and so changes the shape of the uterine cavity.

(6) *Hydrocephalic head.* The cephalic pole of the foetus is larger than the podalic pole.

(7) *Premature children.* The foetus does not fill the uterine cavity, and, consequently, is not guided into its normal position.

(8) *Tumours, and faulty development, of the uterus.*

Positions.—Two positions are recognised :—

1st position, back to the left { in front.
behind.

2nd position, back to the right { in front.
behind.

The first position with the back in front is the one most frequently met with.

Mechanism.—The dimensions of the breech are not of any very great importance. They are considerably smaller than the dimensions of the head, and can be reduced still further by compression. The bi-trochanteric diameter is the greatest, and measures $3\frac{1}{2}$ inches. The sacro-pubic diameter measures 2 inches. The mechanism of the breech is very simple. It engages with the bi-trochanteric diameter in the oblique diameter of the pelvis. As it descends, the anterior hip usually lies at a slightly lower level than the posterior. The former thus reaches the pelvic floor first, and, as a result, rotates in front and lies under the symphysis. The posterior hip rotates round it, sweeps over the perinæum, and is born. The rest of the trunk then follows in the same manner. The attitude of the child is the same as in a vertex presentation; consequently the feet generally come out close to the breech, and the arms are folded across the chest. The head enters the brim with its suboccipito-bregmatic diameter lying in the oblique diameter of the pelvis, and the chin flexed upon the

chest; thus the shortest diameters of the head engage. As it descends, the occiput rotates in front, the chin being still kept closely applied to the chest, owing to the pressure of the coccyx and perinæum. The occiput now rests under the pubes, while the face rolls out over the perinæum, the chin appearing first, then the mouth, nose, eyes, forehead, and occiput.

Diagnosis.—The diagnosis can be made by abdominal palpation and by vaginal examination.

Abdominal Palpation.—By this we determine that the fœtus is presenting by one of its two poles, and that the opposite pole is at the fundus. The pole at the fundus is round and hard, and ballotts easily from side to side independently of the back; there is, moreover, a groove between it and the back. This distinguishes it at once as the head. To confirm this diagnosis we palpate the presenting pole, which is also tolerably round and hard, but which does not ballotte nor move independently of the back; and, in a favourable case, the thighs can be felt springing from it, and the feet lying beside it.

Vaginal examination.—The diagnosis can also be made by vaginal examination when labour is a little advanced, but it is rather more difficult to do so. At the commencement of labour, owing to the tardy fixation of the breech, the presenting part cannot be reached with the finger. At this stage the point most likely to attract attention is the peculiar way in which the membranes bulge. During a contraction they project downwards into the vagina as a cone-shaped tumour. This undue protrusion of the membranes is never found in a normal case, but

always can be noticed when the presenting part or the pelvis is abnormal. In a normal case, the presenting head fills the lower uterine segment completely; consequently, before rupture of the membranes, the liquor amnii in front of the head is completely shut off from the liquor amnii which surrounds the body. When a contraction occurs, the head acts as a ball-valve, and prevents any more liquor amnii from being driven down in front of it (*v.* Fig. 12). Consequently, the tension on the membranes is increased only in proportion as the head advances, and their premature rupture is avoided. If, however, the presenting part does not fill the lower uterine segment exactly, owing to its irregular shape—as in face, breech, or transverse presentations,—or if it is prevented from descending into the lower uterine segment—as in the case of contracted pelvis,—then there is free communication between the waters in front of the presenting part and the waters behind it. The result of this is, that, when a contraction occurs, the liquor amnii round the body is driven downwards in front of the presenting part, and the pressure on the membranes is very greatly increased. This increased pressure causes at first undue bulging of the membranes downward, and, when the os has become partly dilated, premature rupture of them (*v.* Fig. 13). When, therefore, this cone-shaped projection of the membranes is present, we immediately suspect that there is something abnormal, either in the pelvis, or in the presentation.

When labour is more advanced, the presenting part descends within reach of the finger, and can be recognised. It is not at all as easy to distinguish

the breech by vaginal examination as is supposed. By this latter means we determine the presence of a large, tolerably hard and rounded tumour; not at all unlike the vertex, from which it is distinguished by the absence of sutures and fontanelles. It may also be mistaken for a face, on which a large caput succedaneum has been formed. The breech may be distinguished by three bony points and by the anus.



FIG. 12.—Result of the head filling the lower uterine segment exactly —semi-diagrammatic (modified from 'The Norris Text-book of Obstetrics').

The bony points are the two tubera ischii and the tip of the coccyx; and they are so arranged as to form the apices of an equilateral triangle. The anus can only be mistaken for the mouth. It is distinguished from the latter by the absence of the alveolar ridges and of the tongue, by the peculiar way in which the sphincter grips the finger, and by the presence of meconium on the finger when withdrawn. If a

limb has prolapsed, it may be necessary to distinguish between an elbow and a knee, or a hand and a foot. A knee is easily distinguished from an elbow by its larger size, and by the presence of the tuberosity of the tibia and the patellar ligament. The mobility of the patella is a fallacious sign, as the knee is always flexed when it presents, and so the patella

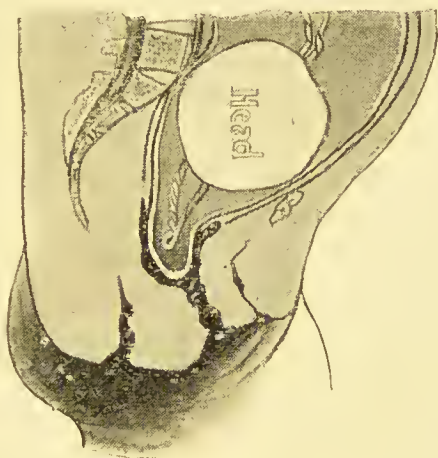


FIG. 13.—Result of the head not filling the lower uterine segment exactly, thus permitting undue pressure on the membranes, and favouring early rupture of them, and prolapse of the cord—semi-diagrammatic (modified from 'The Norris Text-book of Obstetrics').

is fixed. The foot can be distinguished from the hand, most easily, by feeling the heel. In default of it, the phalanges are the best guides; in the foot, the line of the tops of the toes is straight; in the hand, the line of the tops of the fingers is curved. Again, the thumb can be apposed and opposed to the palm; the great toe cannot.

Auscultation.—The heart is heard slightly above

the level of the umbilicus, and to one or other side of the middle line.

Treatment.—A pelvie presentation, if recognised soon enough, can be treated in one of two ways :—

- (1) It can be turned into a vertex presentation, by external version.
- (2) It can be left alone, and delivered as a pelvic presentation.

(1) A pelvie presentation is considerably more dangerous for the child than a vertex presentation ; so that it would appear, at first sight, to be better to turn the child. Before deciding on this, the case must be looked at from another point of view. Pelvie presentations are generally associated with a definite condition in either the child or the pelvis ; and, in many of these conditions, a breech presentation is more favourable for mother or child, or perhaps for both, than a vertex. Therefore, we must consider whether version is likely to improve the condition of affairs, or to do the opposite. These conditions are,—slight degrees of contracted pelvis, or of hydrocephalic head, or placenta prævia. In the first two the after-coming head is more easily delivered than if it came first ; while in the case of placenta prævia, where the proper treatment would be to draw down a leg, we have the leg close at hand. Before turning a breech into a vertex, then, it is well to exclude the presence of any of these conditions. If none of them are present, the child may be turned. The only difficulty in version is to keep the child in its new position. If the turning is done some time before labour begins, the child will turn round again

to a breech presentation. The best time to perform version is after labour has started, but before the breech is fixed, or the membranes have ruptured. Then turn the child by external version (*v.* page 310), and apply a tight binder to keep it in its place.

(2) If a breech presentation is allowed to persist, the treatment of the case is more difficult. There is a general rule for the treatment, during the first stage of labour, of all abnormal cases. It is to avoid anything that may increase the liability of the membranes to rupture prematurely. I have explained how it is that premature rupture of the membranes is the rule in these cases; and, in a breech presentation especially, the prognosis for the child is worse the earlier the membranes rupture. The indication then is to keep the patient quiet during the first stage. Do not allow her to walk about, but rather keep her at rest in bed; also avoid vaginal examination, at any rate during a pain, and do not permit the patient to bear down until after the membranes have ruptured. There is no further special treatment required until the breech appears at the vulva. As the breech slips from behind the perinæum, the attitude of the physician is one of "watchful expectancy." There is nothing to be done in an ordinary case, except to lift out the feet as they come, in order that they may not catch in the perinæum. It is worse than useless to attempt to express a breech, as we do a head. Any attempt merely results in pushing it back into the vagina. Delivery is left to nature until the child is born as far as the umbilicus; then a loop of the cord is drawn gently down, and the patient turned

upon her back with her hips brought out well to the edge of the bed. There are two reasons for thus drawing down the cord:—(1) As the body descends, it compresses the cord against the brim of the pelvis. This pressure is sufficient to prevent the cord elongating, proportionately to the descent of the body. The result of this is, that extreme tension of the cord occurs, between the umbilicus of the child, and the portion of the cord which is caught at the brim. This tension may be so great as to cause the cord to tear. (2) If we draw down a loop of the cord and observe its pulsations, we have an exact indication of the condition of the child.

The patient is now on her back, and everything going on normally, *i. e.* the cord is pulsating. The next uterine contraction drives the child out with the exception of its head, or perhaps may expel it completely. If the head of the child is not expelled by the same pain which expels the shoulders, then assistance must be rendered, as will be shown afterwards. If we can wait sufficiently long to allow the uterus to expel the body of the child, there is little fear of the arms becoming extended above the head. The uterine contractions acting as a *vis a tergo* expel the body, and at the same time keep the arms folded across the chest. But in some cases we cannot wait for the uterine contractions, and are obliged to pull upon the body of the child in order to deliver it more rapidly, *i. e.* *vis a fronte* is substituted for the natural *vis a tergo*. Then the arms are caught at the pelvic brim, and become extended above the head. The cases in which we cannot wait for the uterus to

expel the child are those in which the cord is not pulsating when drawn down. The child is then obviously exposed to the danger of asphyxia, and must be delivered as rapidly as possible. In accomplishing this, the skill and quickness of the accoucheur are tested to the full, and upon them the life of the child depends. Always remember the great difference that exists between the expulsion of the child *vi a tergo*, and the extraction of the child *vi a fronte*. If the arms become extended, the time necessary for the delivery of the case is increased. Never pull upon the body until you have first tried to express the child by pressing upon the fundus, *i. e.* expulsion *vi a tergo*. It is only when this fails that the body is to be pulled upon. If this course of action is necessary, seize the child by the pelvis and draw it downwards as far as possible, while an assistant at the same time presses upon the fundus. The arms usually become extended, and must be brought down before the head can be delivered.

As the child lies in one of the oblique diameters of the pelvis, one arm is posterior, and the other anterior. It is always better to bring the posterior arm down first, as there is more room in the hollow of the sacrum for the operator's hand than there is behind the symphysis. To bring the arm down, the body of the child is drawn forwards towards the mother's abdomen, and as much of the hand as necessary is passed into the vagina, with the palmar surface towards the back of the child. Two fingers are then slipped upwards along the arm until the elbow is reached. If the forearm is flexed, hook

the fingers into the angle of the elbow, and draw it gently downwards over the chest. If the forearm is extended, the fingers must be passed beyond the elbow and hooked over the extensor surface of the forearm; pressure upon the latter causes it to flex, and so to sweep downwards over the face and chest. The posterior arm is thus delivered; and next the anterior arm must be brought down if it is extended. It may be brought down as an anterior arm; or, which is preferable, the body may be rotated in such a manner that the anterior shoulder travels in the direction of the back of the child. The second arm is then brought down, in the same manner as the former arm. In some cases one arm may have become so twisted as to lie behind the neck of the child—the nuchal position of the arm. If this happens, the arm may be set free by rotating the body; or, if this fails, it may have to be fractured before it can be brought down.

Great care must be taken in bringing down the arms to avoid fracturing the humerus or clavicle. The former is most usually broken by attempting to bring the arm down with the fingers upon the middle of the humerus, instead of above the elbow. The clavicle sometimes breaks, when we imagine we are doing everything correctly. This is probably caused by the head of the humerus, as it rotates, being pressed inwards by the pelvic brim, and so tending to approximate the ends of the clavicle.

Now the shoulders are born, and the head alone remains to be delivered. This must be done with the greatest rapidity. It is not only in cases in which traction on the trunk of the child has been

made, that the head requires to be delivered artificially. Whenever the head is not expelled by the same contraction which expels the shoulders, it will require assistance. The reason of this is manifest. When the shoulders are born, the head has left the uterus and is lying in the vagina; accordingly, the uterine contractions have no power to expel it. The head must never be allowed to remain, for a moment longer than is necessary, in the vagina. The cold air, chilling the body of the child, as well as the commencing asphyxia, cause premature attempts at inspiration, and mucus and meconium are sucked into the lungs. Further, if the cord has not been compressed up to this point, it is certainly compressed now by the head. And lastly, as the foetus has left the uterus, the placenta is very probably in process of being detached. There are three excellent methods of delivering the after-coming head:—

- (1) A modification of the Prague method.
- (2) Martin's method.
- (3) Smellie's method.*

Before describing them one point must be insisted upon. The head must be brought into a position of flexion, before any attempt at extraction is made.

(1) *A Modification of the Prague Method.*—This is the quickest and simplest method of delivering the head, if it is in the pelvis; it is of no use when the head is above the brim. Standing at the patient's right side, the fingers of the left hand are hooked

* This method, usually known as the Veit-Smellie method, I find is described in full by Smellie in vol. iii (M'Clintock's edition), case 303.

over either shoulder, and the feet are seized in the right hand. The first step ensures flexion;—the shoulders of the child are drawn directly upwards by the left hand, and detained in this position throughout the extraetion; by this means the pressure of the symphysis upon the oeciput causes flexion of the head. With the right hand the body of the child is then swept forwards and upwards over the mother's abdomen. The head is thus made to roll out from behind the pubes.

(2) *Martin's Method*.—This method is suitable for all cases, whether the head is above or below the brim. With the patient in the cross-bed position—the obstetrieian standing in front of her—the arm corresponding to the side towards which the face is turned, *i. e.* the right arm when the face is on the left, and *vice versa*, is placed so that the body of the child lies upon it straddle-wise. As much as is required of the hand is introduced into the vagina; the mouth is felt for, and two fingers introduced as far back as possible. This last precaution is necessary in order to avoid fraeture of the jaw. With the fingers in the mouth the head is guided, so that its antero-posterior diameter lies in the oblique diameter of the pelvis, or, in the case of a flat pelvis, in the transverse, and at the same time it is pulled down into a position of flexion. The other hand is then placed on the fundus, and by means of pressure upon the oeciput, in such a manner as to cause flexion, the child is delivered.

(3) *Smellie's Method*.—This is also suitable for any case, and is the most powerful method for the extraetion of the head which we have at our disposal. One

hand is used exactly as in Martin's method, whilst the fingers of the left hand are placed over the shoulders as in the Prague method. Flexion is obtained by jaw traction; whilst to deliver, traction is applied both on the shoulders and the jaw. If the head is above the brim, we must first pull backwards and downwards, *i. e.* in the axis of the brim; then directly downwards; and then forwards, at the same time carrying the body of the child as it lies on the arm upwards over the mother's abdomen.

The application of the forceps to the after-coming head only deserves a passing mention. It will extract it without doubt, but it is too slow. It requires time for application, it is not always at hand, and no more power can be obtained by it than by Martin's or Smellie's method. It is surely better to accustom ourselves to the simplest method. If the forceps is used, it must be locked under the body of the child, and traction applied in the axis of the pelvis.

Prognosis.—The mortality as far as the mother is concerned is no worse than in a vertex presentation; the foetal mortality is, however, considerably higher. It is given variously as one in four and one in eleven. The longer the membranes remain intact, the better the os will be dilated, and the quicker will be the passage of the head through the pelvis.

Abnormal Mechanism in Pelvic Presentations.—In a small percentage of cases, the face of the after-coming head may rotate anteriorly instead of posteriorly; It is then rather more difficult to deliver. There are two ways of doing so; the first is the

better method for those cases in which the face of the child is lying behind the symphysis, *i. e.* in the pelvic cavity. To perform it, draw the woman rapidly to the edge of the bed, in order to be able to depress the body of the child, then carry the latter well backwards. By this means the chin is drawn down from behind the symphysis. If the face does not follow easily, introduce the fingers into the mouth and apply traction, so that the face rolls out from behind the symphysis, the forehead following, and lastly the occiput. The other method is just the reverse of this, and is more suitable—in fact, is the only treatment—for those cases in which the chin catches above the symphysis. The body of the child is carried well forwards, so that the occiput rolls out over the perinæum, the forehead following, and lastly the face. The former method is to be preferred, as it enables us to reach the mouth, and so apply traction if necessary.

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FACE PRESENTATION.

Face presentation occurs when the head becomes fully extended. It is, so to speak, a *secondary* or *resultant* presentation, and only arises—as a result of some abnormal condition—at the commencement of labour, except in rare cases of foetal malformation. For the reasons explained under the mechanism of vertex presentations, this presentation is very rare (*v.* page 67) ; it occurs about once in 166 labours.

Ætiology.—Face presentations may arise in three ways. They may be due to :—

(1) Anything that prevents flexion ; as,—tumours about the neck of the child, enlarged thyroid, and hydrothorax.

(2) Anything that tends to arrest the occiput at the brim, whilst at the same time permitting descent of the forehead ; as,—obliquity of the uterus, contracted pelvis, or small tumours about the brim. In lateral obliquity of the uterus the head of the child, instead of being driven directly downwards into the brim, is driven against the opposite side of it ; the result being, that the descent of the occiput is arrested, and the descent of the chin favoured.

(3) Malformation of the child's head ; as,—a congenital dolichocephalic head. It is easy to understand that if such a thing as a congenital dolichocephalic head exists it would favour face presentation (*v.* page 67). We must, however, bear in mind that an acquired dolichocephalic head is the result of the moulding which the head undergoes in a face presentation. So, what we imagine to have been the cause of a face presentation, may in reality only be the result of it.

Positions.—Two positions are recognised :—

1st position, back to the right { behind.
in front.

2nd position, back to the left { behind.
in front.

Mechanism.—The dimensions of the head that come into play in a face presentation are ;—the cervico-bregmatic, $3\frac{3}{4}$ inches ; and the bi-parietal,

$3\frac{3}{4}$ inches. The actual measurement of the cervico-bregmatic is almost the same as that of the sub-occipito-bregmatic, but it cannot be reduced to the same extent by moulding. The mechanism of face presentations resembles, very closely, that of vertex presentations, if extension is substituted for flexion, flexion for extension, and the chin for the occiput. The various steps are as follows:—

(1) and (2) *Descent and Extension*.—The face engages with its cervico-bregmatic diameter in the transverse diameter of the pelvis, or, according to some authorities, in one of the oblique diameters. As the head descends, it, at the same time, extends, until the occiput is almost in contact with the back of the child.

(3) *Internal Rotation*.—Descent continues until the face reaches the pelvic floor, and then, obedient to the rule of internal rotation (*v.* page 70), the chin, which is lowest, rotates in front. It is characteristic of face presentations, that internal rotation occurs at a much later stage, and takes a longer time to complete, than in vertex presentations; so much so, that the swollen face may have appeared at the vulva before rotation commences.

(4) *Flexion*.—The chin now lies under the symphysis, and the head rotating round the latter is born; first the mouth and nose, then the eyes, forehead, and occiput appearing from behind the perinæum.

Diagnosis.—A face presentation can be diagnosed by abdominal palpation or by vaginal examination.

Abdominal palpation.—The first point that strikes us is the comparative ease with which the limbs can

be felt. This is due to the position into which the fœtus is forced by the over-extension of the head; its chest and abdomen are in close contact with the lateral uterine wall, and its back lies more deeply in the uterine cavity than is the case in a vertex presentation. Then, on making the pelvic grip, we feel, on the same side at which the limbs are, and resting upon the pelvic brim, a small tumour "like an animal's hoof" (Budin),—viz. the chin. On the other side, the pelvis is filled by a large tumour separated by a deep groove from the back of the child—viz. the occiput. Also the occiput lies at a higher level in the uterus than the chin (*v.* Fig. 5).

Vaginal examination.—At the commencement of labour nothing can be felt *per vaginam*, as the face is delayed for some time above the brim. If the membranes are not ruptured, we can feel the curious conical protrusion of them into the vagina. The cause of this protrusion is described under breech presentations; it occurs in all abnormal presentations (*v.* page 100). Later on, as the head descends, the presenting part can be felt; but there is considerable difficulty in ascertaining what it is. As a result of the long labour, a large caput succedaneum forms upon the face, and causes it to resemble a breech. The diagnostic points are the supra-orbital ridges, the malar bones, and the mouth, which has to be distinguished from the anus (*v.* page 100). If there is still room for doubt, endeavour to pass a finger upwards, between the presenting part and the pelvis. In the case of a breech we come upon the angle of the groin, in the case of a face upon the ear. In examining a face presentation by vaginal

examination, particular care must be taken not to injure the eyes. It is said also, that the introduction of the finger into the mouth may cause attempts at inspiration on the part of the child, and so lead to asphyxia.

Auscultation.—The foetal heart is heard at a higher level than in a vertex presentation, and, in cases in which the chin is directed anteriorly, is best heard over the limbs instead of over the



FIG. 14.—Schatz's method of converting a face into a vertex. The arrows show the directions in which the body of the child is pushed (Lusk).

back, as is usual in vertex or breech presentations. This is due to the fact that the chest and limbs of the child are pressed against the abdominal wall, while the back is far away from it.

Treatment.—A face can be treated in three ways:—

- (1) If recognised in time it may be changed to a vertex.
 - (2) Podalic version may be performed.
 - (3) It may be allowed to remain a face and treated accordingly.
- (1) If a face presentation is diagnosed in time,

and it is decided to change it to a vertex, the method of Schatz is the best means of doing so. It requires, for its performance, three conditions to be present:—

- (a) Unruptured membranes.
- (b) The face not yet fixed in the brim.
- (c) A lax abdominal wall.

To obtain the last an anæsthetic is usually necessary, though it need not be given if the patient will refrain from straining. The details of the operation are as follows:—Put the patient under an anæsthetic; palpate the abdomen carefully in order to ascertain the position of the child; sitting by the side of the patient and facing her feet place both hands upon the shoulder and chest of the child, and draw them directly upwards out of the pelvis; with one hand on the chest push it in the direction of the child's back, while the other hand on the breech pushes it in the opposite direction; lastly, push the breech directly downwards towards the pelvis, apply a tight binder, and if the vertex does not fix, rupture the membranes (*v.* Fig. 14). The danger of this method is, that complete flexion of the head may not be obtained, and a brow presentation result.

(2) If Schatz's method cannot be performed, and if, after its performance, the face presentation returns, it is best to turn the child into a pelvic presentation and bring down a foot.

(3) If we elect to allow the face presentation to remain, or if it is too late to alter it, it is well to commence by warning the patient's friends that it will be a long and tedious labour, and that there is

considerable danger for the child as well as marked temporary disfigurement. The treatment of all abnormal presentations in the first stage prevails. Keep the patient in bed, and avoid anything likely to cause rupture of the membranes. Let her lie upon the side at which the chin is, as this favours its anterior rotation. As the face approaches the perinæum, it is well to examine, to see if this anterior rotation is occurring. If we think it is not it can be assisted to do so. Bear in mind the law which governs internal rotation (*v.* page 70), and press the forehead upwards during a pain. This causes the chin to become the lowest part of the face, and so favours its anterior rotation. This is all that can be done to help the case. The forceps is dangerous for the child, unless internal rotation has occurred. After this has taken place, the forceps is very rarely necessary, except in those cases in which the non-expulsion of the child is due to uterine inertia (*v.* page 307).

Prognosis.—The mortality in face presentations is somewhat higher for the mother and considerably higher for the child, than in vertex presentations.

Abnormal Mechanism in Face Presentations.—In some cases, probably owing to incomplete extension of the head, the chin of the child rotates posteriorly into the hollow of the sacrum. This is a practically hopeless condition for the child, unless either the head is very small or the pelvis very large. The treatment is mainly prophylactic. Endeavour to favour anterior rotation of the chin, as described above. If this does not occur, perforation is necessary.

CHAPTER IX.

UNNATURAL PRESENTATIONS.

Brow Presentation: Frequency—Ætiology—Positions—Mechanism — Diagnosis — Treatment. Cross-births: Ætiology — Positions—Mechanism; Spontaneous Evolution, Spontaneous Version, Corpore Conduplicato—Diagnosis—Treatment.

UNNATURAL presentations are those presentations which cannot deliver themselves under otherwise normal circumstances without changing into another presentation. They include brow presentations and cross-births.

BROW PRESENTATION.

The foetus is said to present by the brow, when that part of the head between the supra-orbital ridges and the anterior fontanelle lies lowest. A brow presentation, as a face, is a secondary or resultant presentation, occurring after labour has commenced. The proportion of cases in which a brow occurs is difficult to ascertain, as in many cases of brow presentations, flexion recurs and a vertex again results, or extension continues and a face presents. The proportion of cases in which a brow is either recognised and changed, or remains unchanged, is about 1 in 500.

Ætiology.—The causes of a brow presentation are

practically the same as those of a face (*v.* page 113).

Positions.—Two positions are recognised :—

1st position—back to the left $\left\{ \begin{array}{l} \text{in front.} \\ \text{behind.} \end{array} \right.$

2nd position—back to the right $\left\{ \begin{array}{l} \text{in front.} \\ \text{behind.} \end{array} \right.$

Mechanism.—The diameters of the head, which engage in the brim in brow presentations, are the supra-occipito-mental ($5\frac{2}{5}$ inches), and the bi-parietal ($3\frac{3}{4}$ inches). In many cases the head does not enter the brim at all. If it enters, the supra-occipito-mental diameter of the head lies in the transverse diameter of the pelvis. Four possibilities are then present :—

- (1) With a small head or a large pelvis the brow may be born unchanged.
- (2) The brow may become converted into a vertex.
- (3) The brow may become converted into a face.
- (4) The head may become impacted in the pelvis.

If the brow is to be born unchanged, internal rotation must take place in such a manner, that the forehead rotates behind the symphysis. The cranial vault then sweeps over the perinæum, and lastly the face descends from behind the symphysis.

Diagnosis.—*Abdominal palpation.*—Nothing characteristic is noticed about the body of the child. On making the pelvic grip the head will be found to lie well above the brim, with the chin and occiput on the same level (*v.* Fig. 5).

Vaginal examination.—The presenting part can only be reached with great difficulty at the commencement of labour, owing to the high situation of the head. The membranes are felt bulging in a cone-shaped tumour, as is usual in abnormal presentation. Later in labour, if the head descends, the presentation is characteristic. On one side of the pelvis is felt the anterior fontanelle, and the smooth frontal bone with its median suture; on the other side the supra-orbital ridges, the hollows of the eyes, and the malar bones. The caput succedaneum forms over the prominences of the frontal bone.

Auscultation.—The heart is heard slightly to one or other side of the median line, according to the position of the back of the child.

Treatment.—The first thing to understand clearly is, that a brow presentation is never to be left uncorrected, if it can be changed. If it cannot be changed into either a vertex or a face, and if it is too late to perform podalic version, its expulsion is best left to the natural efforts alone. Nature will frequently correct a case which we cannot. The forceps should never be used except as the last chance before perforation, and not even then if the face is posterior. A brow presentation can be corrected in three ways:—

- (1) By completing flexion, *i. e.* by turning it into a vertex.
 - (2) By completing extension, *i. e.* by turning it into a face.
 - (3) By version and bringing down a foot.
- (1) If the brow is free above the brim, or at any rate not too deeply engaged, it may be converted

into a vertex by the following method. The operator, with one hand in the vagina, pushes the head upwards out of the pelvis, directing his force especially against the forehead so as to favour flexion. An assistant then presses the child's shoulders in the direction of its back, as in Schatz's method (*v.* page 117). Flexion is finally completed, either by pushing the occiput downwards into the pelvis by pressure through the abdominal wall, or by pulling it down with the vaginal hand, which has been passed above it. The head is then kept in this position by means of a tight binder, and the membranes ruptured, if this has not been already done.

(2) If the brow is too far down in the pelvis to be converted into a vertex, we may endeavour to change it into a face. This is best done by pressing upwards at each side of the large fontanelle during a pain, as this will tend to cause the descent of the chin. It will probably be unsuccessful, except in those cases in which nature would have brought about the same end.

(3) Podalic version should if possible be adopted if, after a vertex presentation has been obtained, the head returns to its original position.

If, at any time, the child is found to be dead, perforation should be performed, unless the head is about to be delivered immediately by the natural efforts.

Prognosis.—The maternal and foetal mortalities are considerably higher in this presentation than in either normal or natural presentations.

CROSS-BIRTH.

Cross-birth, transverse presentation, and oblique

presentation, are the different terms applied to the presentation of the foetus, when it lies in the uterus in such a manner that neither pole presents. Strictly speaking, a transverse presentation only occurs when the foetus lies with its head at one side of the uterus, and its breech directly opposite. Similarly, an oblique presentation occurs when the foetal head or breech lies in one hypochondrium, the other pole being in the opposite iliac fossa. The term cross-birth includes both these varieties.

Ætiology.—Any condition which causes a variation from the normal shape of the uterus or pelvis will favour a cross-birth. The principal of these conditions are,—contracted pelvis; large lax uterus; hydramnios; twins; placenta prævia; and tumours of the uterus, as myomata. Abnormalities in the shape or size of the child, will also favour a cross-birth; as,—a very large foetus; a very small or premature foetus; tumours on the body of the child; and double monsters. The relative frequency of transverse presentations is about one in 178 deliveries.

Positions.—Many complicated classifications of the various positions met with in cross-births have been recommended from time to time. Of them all, that brought forward by Hohl seems most simple, especially as it most nearly corresponds to the classification of the positions met with in vertex presentations:—

| | | |
|----------------------|---|--|
| 1st position—head to | { | back in front (1st position of Winckel). |
| the left | | back behind (4th " "). |
| 2nd position—head to | { | back in front (2nd " "). |
| the right | | back behind (3rd " "). |

The relative frequency of the two positions is about the same, but the back most frequently is directed forwards.

Mechanism.—Cross-births, like brow presentations, must never be allowed to remain unchanged, except in the case of very small or macerated infants. They can deliver themselves sometimes under these conditions. Delivery may then occur in one of three ways :—

- (1) By spontaneous version.
- (2) By spontaneous evolution.
- (3) *Corpore conduplicato*.

(1) *Spontaneous version* occurs when the presenting shoulder is pushed away from the os by strong pains, and the head or breech takes its place. Delivery is then usually rapid.

(2) *Spontaneous evolution* occurs as follows :—The shoulder of the child is driven down into the pelvis, and the corresponding arm prolapses out of the vagina. The shoulder then becomes fixed under the symphysis, while the back, acutely flexed, gradually appears from behind the perinæum. The breech follows, and the lower limbs; the last part to be born is the head and remaining arm.

(3) Expulsion *corpore conduplicato* is an extremely rare occurrence, and is only possible with a very premature fœtus, or one which is in an advanced condition of maceration. The shoulder which presents is driven down into the pelvis, closely followed by the head and the rest of the trunk; the head and chest thus descending together.

Diagnosis.—*Abdominal palpation.*—A cross-birth can readily be diagnosed by this means. At the

commencement of labour the pelvic brim is found to be empty ; the head is felt at one side of the abdomen, and the breech at the opposite.

Vaginal examination.—No presenting part can be felt at first. The membranes protrude unduly into the vagina during a pain. If the case has become a so-called neglected shoulder presentation, the shoulder can be felt, a few of the ribs, and the arm prolapsed into the vagina. This latter is recognised as already mentioned (*v. page 57*). To decide whether it is the right or left arm, imagine yourself shaking hands with it. If your hand lies palm to palm with it with the thumbs together, it is the right or left, according as the hand you are examining with is right or left. It must not be forgotten, that, although in a neglected cross-birth the shoulder is practically always driven down into the pelvis, still at the commencement of labour other parts of the body of the foetus may present. The middle of the back may lie lowest, or a foot and a hand may come down together.

Treatment.—A cross-birth may be treated in one of four ways :—

- (1) Postural treatment.
- (2) External cephalic version.
- (3) Internal or bi-polar podalic version.
- (4) Embryotomy.

(1) *Postural treatment* is often sufficient in cases of slight obliquity of the foetus. To be of service, the membranes must be unruptured, and no limb must be prolapsed through the os. We must first understand the theory on which the method is based. When the patient lies upon her side, the

fundus of the uterus falls over to that side under the influence of gravity, carrying with it whatever pole of its fœtus it contains, and so causing a corresponding elevation of the opposite pole. Accordingly, if the head is in one iliac fossa, and the patient lies on the same side, the breech will fall towards that side, and the head will rise towards the opposite side.

(2) *External cephalic version* requires the same conditions as the previous method. It is to be used when the obliquity of the fœtus is too great to be corrected by postural treatment. It will not always be successful, as the child tends to slip back to its original position. It should, however, always be given a trial, if the case is seen in time, as, if successful, it gives the child a better chance of life. It is useless to attempt it until the patient is in labour, as, otherwise, the head would not fix, and the malpresentation would recur. The child is turned by external version until the head comes over the brim; the membranes are then ruptured and the head held there until it fixes, or a tight binder is applied to keep it in its place.

(3) *Internal podalic version*, unless directly contra-indicated through fear of causing rupture of the uterus, must be adopted in all cases in which external cephalic version has failed, or where the necessary conditions for performing it are not present. Any form of version is contra-indicated in cases of neglected shoulder presentation, when a considerable portion of the child has been expelled out of the uterus, or when the contraction ring is more than $2\frac{1}{2}$ inches above the symphysis (Winckel).

Version may also be impossible to perform, owing to the force with which the child has been driven into the pelvis. When the leg of the child has been drawn down into the vagina, it is well to leave the further expulsion to nature, unless there is an absolute indication for immediate delivery. (For the methods of performing version, *v.* page 313.)

(4) *Embryotomy* is indicated in a neglected shoulder presentation:—

- (a) When podalic version is contra-indicated owing to the condition of the uterus.
- (b) When podalic version is impossible.
- (c) When podalic version is difficult and the child is dead.

Decapitation performed by means of a Braun's blunt hook is the best mode of procedure (*v.* page 328). If the neck cannot be reached, evisceration must be performed (*v.* page 329).

Prognosis.—The foetal mortality is very high. About 33 per cent. of children alive at the commencement of labour are born dead. The maternal mortality is about 5·5 per cent. (Winckel).

CHAPTER X.

MULTIPLE PREGNANCY.

Varieties—Frequency—Twin Pregnancy—Ætiology—Diagnosis
—Presentations—Course of Labour—Treatment—Prognosis
—Complications: Locked Twins, Entangling of the Cords,
Fœtus Papyraceus.

MULTIPLE pregnancy is the term applied to the presence of two or more children in the uterus. Twins occur once in 88 births, triplets once in 7820, quadruplets once in 366,913; quintuple births have been recorded.

Twin pregnancy may occur in two ways. Either one ovum contains two nuclei, both of which become fertilised; or two separate ova may become fertilised. In the former case, the children are of the same sex: there is but one placenta and one chorion, but there are two amnions. In the latter case, the children may or may not be of the same sex; there are two placentæ, two chorions, and two amnions. It must not be forgotten, that two placentæ may grow in such a position that their edges coalesce, and so there may appear to be but one placenta. The nature of these cases is shown by the fact that there are two chorions.

Diagnosis.—The only absolutely certain way to diagnose twins is for two observers to count the foetal hearts at the same moment, and to find that their results do not correspond. If monsters are excluded, twins can also be diagnosed by palpating

two heads, two breeches, two backs, more than two large parts (viz. a head or breech), and more than four limbs.

Presentations.—Abnormal presentations are relatively more common in multiple than in single pregnancies. The following table represents the proportion of the different presentations :—

Two head presentations occur in 49 per cent. of twin pregnancies.

| | | | | |
|---------------------------|---|------|---|---|
| A head and a breech | „ | 31.7 | „ | „ |
| Two breeches | „ | 8.6 | „ | „ |
| A head and a transverse | „ | 6.18 | „ | „ |
| A breech and a transverse | „ | 4.04 | „ | „ |
| Two transverse | „ | 0.35 | „ | „ |

(*Spiegelberg.*)

The usual course of labour is, that, after the birth of the first child comes the second child; then the placenta of the first child; and then the placenta of the second child. In a small proportion of cases the first child is followed immediately by its placenta; then the second child and its placenta.

Treatment.—Having diagnosed the presentation of the first child, there is nothing further to be done but to allow it to be born naturally. Then palpate the presentation of the second child, as it may be lying transversely. If so, correct the presentation. Rupture the membranes of the second child about thirty minutes after the birth of the first, if they have not already burst spontaneously. This is always necessary, otherwise the second child might be retained in the uterus for some hours or even some days. Twins are frequently premature, and when the over-distended uterus has been relieved, by the birth of one child, it may lose its irritability. Cases have been recorded in which the second twin

has been retained for a fortnight, or even more, after the birth of the first. In fact, some authorities recommend, in cases in which the placenta of the first child follows it, to put on a binder and keep the patient quiet, in the hope that the second child may not be born until full term. This treatment, however, exposes the woman to all the pain and expense of a second confinement. The object of waiting for thirty minutes after the birth of the first child, before rupturing the membranes, is to give the uterus a temporary rest, and so minimise the danger of atonic post-partum hæmorrhage.

Prognosis.—The prognosis in twin pregnancy is little worse, for the mother, than in a single pregnancy. For the children, the prognosis differs according to the presentation. But, as the children are usually small, and the maternal parts, at any rate for the second child, are well dilated, the mortality is less than the same abnormal presentation would cause in a single pregnancy. Many twins, though born alive, die during the first month of their existence, as a result of their premature birth.

Complications.—Dystochia may arise in twin pregnancy owing to the children becoming interlocked during birth. It may occur in three ways:—

(1) Two very small heads enter the pelvis at the same moment; rotation is thus prevented, and further delivery without assistance is impossible. The treatment consists in endeavouring to push up one head, so as to allow the other to descend. If the latter fails to do so, the forceps must be applied. In very rare cases perforation may be necessary.

(2) Both children present by the head, one a little

in advance of the other. The head of the second child becomes driven down into the neck of the first, and so prevents any further descent. The head of the second must be pushed up, and the first extracted by forceps.

(3) The first child presents by the breech, and is partially born. The second child presenting by the head enters the pelvis in such a manner, that its chin becomes locked under the chin of the after-coming head of the first child. If the second head cannot be pushed up, an attempt may be made to extract it with forceps past the body of the first child. If this fails, or if the first child is dead, it should be decapitated, its head pushed up, and the second child extracted by forceps. In any of these cases in which decapitation or perforation is necessary, the first child should be sacrificed, as it is the more likely to be dead.

Entangling of the cords sometimes happens in multiple pregnancy. As a result, one or both children may die *in utero*. Also, during the birth of the first child, the cord of the second may be pulled down into a sharp angle, and so circulation through it be prevented. Lest this accident should happen the cord of the first child should never be pulled upon.

A *fœtus papyraceus* is formed when one child dies *in utero*, but the other lives. As no air gains access to the dead child the latter does not putrefy, but shrivels up and becomes mummified. The growing child then presses against it, and flattens it out against the uterine wall; and it is found, after birth, adherent to the membranes.

CHAPTER XI.

THE PUERPERIUM.

Physiological Phenomena—The Involution of the Uterus—The Lochia: Varieties, Amount—Lactation: Amount, Composition of Human Milk—Prognosis—Treatment—Complications: Subinvolution.

THE puerperium is the term applied to the period during which the woman is recovering from the effects of pregnancy and childbirth. During the puerperium the parturient canal is returning to its normal condition, and lactation is being established.

Physiological Phenomena.—There are certain physiological phenomena to be considered which are peculiar to this period. These are:—

- (1) The involution of the uterus.
- (2) The lochial discharges.
- (3) The establishment of lactation.

(1) *Involution.*—The uterus takes six weeks to return to its normal non-impregnated condition. Immediately after delivery it weighs 24 ounces, and this has to be reduced to the normal weight of 9 to 10 drachms (Heschl). This process of involution is chiefly caused by the diminution that occurs in the blood-supply of the uterus after delivery. The uterus, contracting tightly, com-

presses and so obliterates the greater number of its nutrient vessels. The muscle-fibres, as a result, undergo a fatty degeneration, and come away in the lochia as fat droplets. As the uterus involutes, it decreases in size; and by the ninth day the fundus lies at the level of the upper margin of the symphysis pubis (Winckel).

(2) *The Lochia*.—The lochia is the discharge which comes away during the ten days or so succeeding delivery. It consists at first principally of blood. It also contains fragments of placenta, and membranes. Later on, cervical and vaginal epithelium, white corpuscles, crystals of cholesterin, and fat droplets are found. From the third day onwards, numerous forms of micro-organisms are present (Winckel). Three varieties of lochia are recognised. First comes the *lochia rubra* or *cruenta*, which lasts for about three days; it is nearly pure blood. It gradually changes to the *lochia serosa*, which is sero-sanguineous. This persists until the sixth or seventh day, and then gradually passes into the *lochia alba* or *lactea*, which is principally mucus, and is creamy in colour, due to the presence of white corpuscles. The total amount of lochia that comes away is about $3\frac{1}{4}$ lbs., the lochia rubra composing far the largest portion of it.

(3) *Lactation*.—The fluid which is found in the breast during the first forty-eight hours after delivery is called *colostrum*. It differs from ordinary milk, in that it contains less caseine, and more serum-albumen, fat, sugar, and inorganic salts. The milk proper becomes established about the evening of the second day, and rapidly increases in amount. The

quantity of milk which a woman secretes is shown by the following table :—

| | | | | | | | | | | | |
|------------------|---|----------------|---|----------------|----|----|-----------------|----|----|----|----|
| Day | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Amount in ounces | 0 | $3\frac{1}{3}$ | 7 | $8\frac{1}{4}$ | 13 | 15 | $17\frac{1}{2}$ | 19 | 22 | 23 | 25 |

(Winckel.)

The average composition of human milk at first is :—

| | |
|---------------------------|--------|
| Albuminoids | 2.00 |
| Fats | 4.13 |
| Sugar (lactose) | 7.00 |
| Inorganic salts | 0.20 |
| Water | 86.67 |
| | <hr/> |
| | 100.00 |

(Starr.)

Prognosis.—We can tell whether or not the patient is progressing favourably during the puerperium, by inquiring into certain points. They are :—

(1) *Aspect.*—The aspect of the patient is of the greatest importance. If her condition is satisfactory there should be no change from what it is under ordinary circumstances. In any septic condition her face becomes drawn and pinched, and has a yellow tinge; the angles of the nostrils are drawn down; and the whole appearance is altered.

(2) *Sleep.*—The amount of sleep the patient has had, is also a most important sign. Sleeplessness is often one of the first indications of commencing sepsis; and, on the contrary, if the patient sleep well, she generally is progressing favourably.

(3) *Temperature.*—Slight variations of temperature are very common during the puerperium, so that any temperature which does not exceed 100.8° F.

in the axilla may be considered as normal. Any rise above that, points to some abnormal condition.

(4) *Pulse*.—The pulse ranges between 50 and 90 beats per minute. It is often a most important aid in the diagnosis of sepsis. If the temperature rises, but the pulse remains tolerably normal, the condition in all probability is not serious.

(5) *Milk*.—The milk should flow freely, after the second day; a sudden cessation of it, points to septic infection.

(6) *The Lochial Discharges*:—their amount, their colour, their odour, and the stain they leave upon the napkin. Normal lochia should flow freely at first, and cease gradually. Sudden stoppage sometimes corresponds to the onset of sepsis. The colour should change according to the day of confinement, as mentioned. If the lochia continues to be of a red colour after the sixth day, it shows that some degree of sub-involution is present. The normal odour of lochia is heavy, and somewhat resembles that of blood; any putrid odour is pathological. The stain on the napkin caused by healthy lochia, differs considerably from the stain caused by putrid lochia. The former is red in the centre and fades away towards the edge, which is colourless. The latter is not so red in the centre, but becomes deeper in colour towards the edge, which is clearly defined.

The relative value of these points is well brought out in the following words. “If a patient with a high temperature looks well, sleeps well, and says she is well, she is at any rate not septic.” “If a patient with a high temperature looks very ill, sleeps

very badly, and says she feels very ill, she generally is very ill." "If a patient with a high temperature looks very ill, sleeps very badly, but says she is very well, she will probably die" (Smyly). The last condition is known as *euphoria*, and will be described under acute sepsis (*v.* page 267).

Treatment.—The treatment of the patient during the puerperium, is best considered under certain headings:—

Rest.—As soon as the patient has been delivered and comfortably settled, she should be kept perfectly quiet, and allowed to sleep if she can. During the first few days she will probably spend the greater part of her time in this manner. She should be kept in bed until at least the seventh day, and *longer* if possible. Whatever day she gets up, it must not be until the red lochia has ceased, as many cases of sub-involution and retroflexion are caused by so doing.

Diet.—For the first two days the patient is kept on light nutritious food;—beef-tea, gruel, milk, tea and toast, and egg well beaten up,—anything of this nature may be given. After this the diet is more liberal, and, if her bowels have moved, she may have any ordinary digestible food. Stimulants are not necessary unless the patient is very weak. If she is in the habit of taking them regularly it may be advisable to continue them.

Bladder.—The bladder should be emptied within six hours after the confinement. It is occasionally impossible to get the patient to do so of her own accord. The recumbent position, and the presence of slight lacerations and bruises about the urethra,

combine to prevent her. If this is so, the catheter must be passed for the first couple of days; but, after this, every attempt must be made to induce the patient to pass water naturally. It is a very different matter to pass a catheter on the first or second day after confinement, and to pass it on the fourth or fifth. The lochia then contains bacteria, and may be lying decomposed about the external genitals; a little of it carried into the bladder may start a severe cystitis. If the patient cannot pass water in the recumbent position, even after hot stupes and pressure over the bladder have been tried, she should turn on her hands and knees, and endeavour to do so in this position; or, after the fourth day, she may get up and stand by the edge of the bed. If, as a last resource, the catheter must be passed, the parts must be most thoroughly washed up. Then the urethra must be exposed, and the catheter passed by vision, not by touch. A silver or glass catheter should always be used, and not a gum-elastic one, on account of the difficulty of sterilising it.

Bowels.—The usually accepted idea is that the patient should not get a purgative until the third day. The majority of patients are, however, much relieved by, and considerably the better for, a brisk purgative on the evening of the second day. Castor oil (ʒj—ʒij), Cascara Sagrada (ʒj—ʒij), or Mag. Sulph. (ʒss) may be given. An aperient should be administered every second day during the puerperium, if the bowels do not move of themselves.

Complications.—The complications to be feared during the puerperium are;—hæmorrhage, sepsis,

and sub-involution. Of the first two I shall say nothing now.

Sub-involution is the resultant condition in those cases in which the uterus does not diminish in size in the normal manner. It is recognised by the persistence of red lochia, and by the presence of the fundus above the symphysis after the ninth day. The immediate treatment is rest in bed, hot vaginal douches, and the administration of ergot internally. Ergot given a few times in tolerably large doses—up to a drachm of the liquid extract—gives better results than small doses long continued. If the condition persists, the ultimate treatment consists in curetting, and the correction of any malposition of the uterus which may be present.

CHAPTER XII.

SOME DISEASES OF PREGNANCY.

Morning Sickness and Hyperemesis—Nephritis Gravidarum—
Anæmia—Hydræmia—Varicose Veins—Hæmorrhoids—Sali-
vation—Pyrosis—Pruritus Vulvæ—Neuralgia.

THERE are certain mild disorders which occur during pregnancy which are so constant in their occurrence that they may almost be called physiological. These are due partly to the pressure of the growing uterus, partly to changes in the blood and in the activity of the nervous centres.

Morning Sickness.—The commonest of these disorders is, perhaps, the nausea or vomiting of the early months,—the so-called morning sickness. This is reflex in origin, and is ascribed by Rhein-
städter to the passive movements of an enlarged uterus against the intestines. It is more likely to be due to the hyper-sensitive condition of the patient. The severity of the condition varies very much in different subjects. In some it is little more than a slight sense of nausea, whilst in other cases—happily rare—it may reach such a pitch, that the gravest result is to be apprehended. It is then known as hyperemesis, and becomes one of the severest diseases of pregnancy.

Treatment.—In its mild form morning sickness requires little treatment; the regulation of the

bowels is generally sufficient. A tea-cup of very hot water the first thing on awaking, or a light breakfast in bed at 7.30 a.m. or 8 a.m., consisting of a cup of tea and a small piece of dry toast, will usually overcome any tendency to vomit. If this is not enough, the administration of bicarbonate of soda, subnitrate of bismuth, aromatic spirits of ammonia, or of a pill containing calomel $\frac{1}{4}$ gr. and Pulv. Ipecac. $\frac{1}{4}$ gr. may be tried. I have special faith in hot water, or in an effervescing mixture containing hydrocyanic acid.

Hyperemesis Gravidarum.—The severer form of vomiting, namely, hyperemesis, though certainly not a physiological disorder, may be mentioned here. It is a most serious disease. The patient vomits so constantly, that no food can be retained in the stomach. She is reduced to a skeleton, and unless the vomiting can be checked, death follows. There is also most frequently albuminuria, marked diminution in the amount of urine passed, and extreme constipation. Indeed, it is questionable whether these should not be put down as the cause of the condition.

Treatment.—The first essential in the treatment is absolute rest in bed, the room being kept dark and warm. If this fails to check the sickness, all food by the stomach must be prohibited, and rectal alimentation substituted. Enemata of beef juice, brandy, peptonised milk, egg, are to be used, and sedatives may be given in the same manner. Bromide of potassium, chloral, codeia, Tr. Opii, are all recommended. The patient is allowed to suck ice

to relieve her thirst, or to take small sips of champagne or hot water.

Attention should be called to the local lesions that often accompany these manifestations, namely, erosion of the cervix and retrodeviations of the uterus. Milder forms of vomiting have been entirely checked by relieving them, and especially in the case of erosions, by painting the cervix frequently with cocaine.

Another form of treatment is recommended by Dr. Copeman, who states that he has cured many cases by dilatation of the cervical canal, and detachment of the membranes round the internal os. His method is to pass the finger through the os internum, and keep it in position for a few moments. The statistics of this method are so favourable that it certainly deserves a trial. It should be combined with the treatment of any erosion that may be present. If done aseptically, it at any rate does no harm, and may be tried before resorting to artificial abortion. If none of these methods succeed, then nothing remains but the induction of abortion. The worst of this treatment is, that, being an extreme measure, it is put off in most cases so long, that when it is accomplished the patient is too far gone for recovery.

The prognosis of hyperemesis is bad. Joulin has reported 121 cases with 49 deaths, or something over 40 per cent.

Nephritis Gravidarum.—This condition is met with under four different aspects (Dührssen):—

(1) The kidney of pregnancy (Leyden).

- (2) The relapsing kidney of pregnancy.
- (3) True nephritis arising during pregnancy.
- (4) Chronic nephritis.

(1) *The kidney of pregnancy*.—The pathological condition of the kidney of pregnancy is one of fatty infiltration of the epithelium, due to an anæmia, which in turn is said to be caused by spasm of the renal arteries produced reflexly by stimuli from the genital tract. This infiltration of the epithelium permits the passage of albumen and interferes with the secretion of urine. In severe cases it may even cause total suppression.

The first symptoms usually appear in the later months of pregnancy, and consist in the occurrence of headache, vomiting, and œdema of the extremities, face, and body. The urine diminishes, is loaded with albumen, and contains tube-casts, renal epithelium, and a few blood-corpuscles.

This is the commonest condition of the kidney to give rise to eclampsia,—its treatment will be described in the chapter on the latter (*v.* page 228). The kidney as a rule returns to its normal condition after pregnancy is over, but on the other hand the condition may pass into one of true chronic nephritis.

(2) *The relapsing kidney of pregnancy*.—This is the term applied to the condition of the kidney in those cases in which albumen and casts are found in the urine early in pregnancy, disappear after delivery, and return with each subsequent pregnancy. The foetus usually dies from degeneration of the placenta and is expelled. Eclampsia is of rare occurrence.

(3) and (4) These conditions both cause albuminuria, casts, and diminution of urine. They do not tend to cause eclampsia, but on the other hand favour the death of the fœtus, the premature detachment of the placenta, the occurrence of retinitis and of cerebral hæmorrhage. Chronic nephritis existing previous to pregnancy is greatly aggravated by the occurrence of the latter. Cardiac hypertrophy is usually present, and in advanced cases the secondary results of a failing heart.

Treatment.—The treatment is at first the same as for pregnancy kidney—milk diet, &c. (v. page 228). In severe cases, as shown by the occurrence of retinal hæmorrhage, rigors, commencing suppression of urine, threatened cardiac failure, it will be necessary to induce premature labour. If the patient does not come for treatment until she has reached that stage at which the kidneys or the heart have almost completely failed, it is not advisable to induce labour until every attempt has been made to restore their action. If this can be done labour should then be induced.

Anæmia.—Normally the number of red blood-corpuscles is increased during pregnancy, but sometimes the opposite is the case. The commonest causes of this condition are bad food, bad digestion, insufficient exercise in the open air.

Treatment.—The treatment is largely prophylactic. If any active measures are necessary, iron in some form is administered. Lusk especially recommends Ferrum Redactum in 3-grain doses. The bowels must be regulated by the use of purgatives, and

for this purpose tabloids containing aloin in conjunction with ferrous carbonate are of great use.

Hydræmia.—This may be considered in connection with anæmia, as they often occur together. When hydræmia occurs, it not infrequently causes œdema of the lower extremities and vulva. If the possibility of renal disease is excluded, this condition is of slight importance. If the labia are excessively œdematous, they may offer an obstruction to delivery, or even in some cases may become gangrenous. Unless either of these terminations is feared, the condition requires little treatment.

Treatment.—If the œdema is moderate, rest in the recumbent position and the application of lead lotion will relieve it. In cases of enormous distension of the labia it may be necessary to puncture them. The danger of this proceeding is that labour may ensue, or suppuration may occur; consequently it should only be resorted to if absolutely necessary, and then every possible precaution must be taken to prevent infection.

Varicose Veins.—These frequently form in the later months of pregnancy. The treatment must be palliative, as an operation is by many considered to be contra-indicated, unless absolutely necessary. An elastic bandage applied to the affected limb is usually sufficient. If the veins still continue to increase in size, and threaten to rupture, the patient should be kept in a recumbent position.

Hæmorrhoids.—These are also a very common

trouble at the end of pregnancy. Usually they disappear a short time after delivery, but sometimes they persist, and give rise to such annoyance as to necessitate their removal. During pregnancy, the only treatment which we can adopt is to keep the motions soft and regular, and to use some soothing application, as Ung. Galli c̄ Opio. Tr. Arnicæ in water two drachms to the ounce; Tr. Opii in water; and Hazeline are also useful.

Salivation.—This may be extremely troublesome, but it is a rare affection. Desire the patient to wash out the mouth with an astringent solution, or administer internally two- to four-minim doses of Liquor Atropinæ Sulphatis.

Pyrosis.—This condition depends upon bad digestion of food, or constipation. If the cause is treated it will usually cease. The common Mistura Ferri Sulphatis of hospital pharmacopœias is one of the best mixtures that can be used. It is as follows:—

℞ Mag. Sulph. ʒj.
Acidi Sulph. Dil. ʒiss.
Ferri Sulph. gr. xvi.
Aquæ Menth. Pip. ad ʒviij.
Sig. ʒj ter in die.

If the patient cannot take this, a pill, containing a third of a grain of calomel, three times a day, is an excellent laxative, can always be taken, and is usually sufficient.

Pruritus Vulvæ.—This is a most distressing condition. It is usually caused by vaginal discharge, but

may also be due to diabetes and parasites. If vaginal discharge is the cause, the great point in the treatment is cleanliness. The patient should bathe the parts twice or thrice daily with warm water, in which some mild astringent is dissolved, as borax, very dilute sulphate of copper solution, or pyroligneous acid. Vaginal douches at the same time may be used, such as pyroligneous acid 1 in 4, boracic acid (saturated solution) or carbolic acid 1 in 80. If an erosion of the cervix is the cause of the discharge it should be touched with pure carbolic acid, or a solution of sulphate of copper thirty grains to the ounce, or pyroligneous acid applied every couple of days. If these manipulations are performed with gentleness there is no fear of bringing on labour. At the same time the pruritus itself may be relieved by applying some soothing ointment, as Ung. Oxidi Zinci. This acts by preventing the discharge from coming in contact with the skin, while at the same time it relieves the irritation.

Neuralgia.—Various neuralgic affections are common in pregnancy, particularly involving the regions supplied by the fifth cranial nerve. Local application of warmth, or of camphor or chloroform liniment, will usually relieve the pain. Quinine, bromide of potash, phenacetine, antipyrine, or hyoscyamus, especially the first, are also sometimes of use.

CHAPTER XIII.

ERRORS OF DEVELOPMENT, OR OF POSITION, OF THE
PREGNANT UTERUS.

Malformations of the Uterus—Malpositions of the Pregnant Uterus—Pathological Antelexion—Retroflexion—Incarceration of a Retroflexed Uterus: Symptoms, Treatment—Pro-lapse of the Uterus: Treatment.

MALFORMATIONS OF THE UTERUS.

To understand these conditions, it is necessary to refer for a moment to the development of the geni-

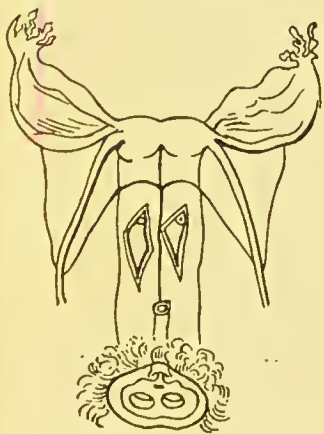


FIG. 15.—Double uterus and vagina.
(Courty.)

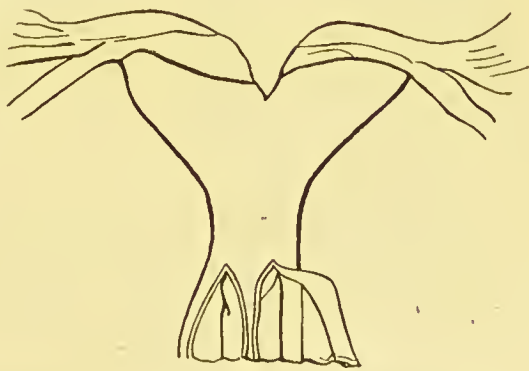


FIG. 16.—Uterus bicornis.
(Schroeder.)

tal organs. Two tubes—the ducts of Müller—run down at either side of the spine in the early embryo. They unite in their lower half, and the

septum which at first separates them disappears. From the upper ununited portions of the ducts are derived the Fallopian tubes; from the lower portions which coalesce are derived the uterus and vagina. We see, then, that the Fallopian tube, with its corresponding portion of the uterus and vagina, was once a single duct. If this point is clearly grasped, it is easy to understand the different malformations that may arise:—

(1) The tubes may unite in their lower half, but may not coalesce, and thus an *uterus duplex* or *didelphys* be formed (v. Fig. 15).

(2) The tubes may not unite until the level of the cervix is reached, and thus an *uterus bicornis* may be formed (v. Fig. 16).

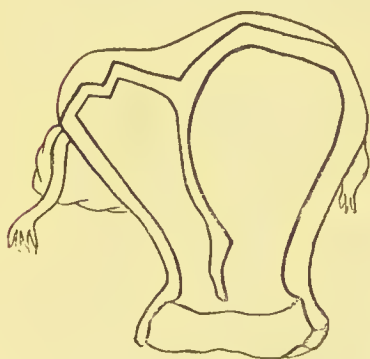


FIG. 17.—Uterus septus bilocularis.
(Cruveilhier.)

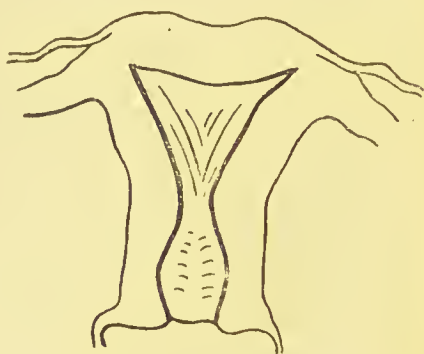


FIG. 18.—Uterus cordiformis.
(Kussman.)

(3) The tubes may unite, but the septum may persist (a) in the uterus—*uterus septus bilocularis* (v. Fig. 17); (b) in the vagina—*vagina septa*.

(4) One Müllerian duct may develop whilst the other remains rudimentary—*uterus unicornis* (v. Fig. 19).

(5) A depression may remain at the top of the fundus, corresponding to the point where the ducts united—*uterus cordiformis* (v. Fig. 18).



FIG. 19.—Uterus unicornis. (Courty.)

In order that pregnancy may occur in any of these abnormalities, it is necessary that, at least, one side of the genital tube is fully developed.

If pregnancy occurs in a double uterus, certain complications may arise:—

(1) Abortion. This is unusual.

(2) Tedious labour, due to the accompanying imperfect development of the uterine muscle, or to the obstruction offered by the other half of the uterus.

(3) Post-partum hæmorrhage, and retained placenta. This occurs particularly if the placenta is attached to the septum.

If pregnancy occurs in the rudimentary horn of an uterus unicornis, the condition resembles extra-uterine pregnancy. The treatment is similar.

MALPOSITIONS OF THE UTERUS.

Pathological Antelexion.—This condition occurs

when the fundus is fixed in a position of ante flexion. It may be :—

(1) Congenital.

(2) The result of inflammation.

(3) The result of vaginal fixation of the uterus, for the cure of chronic retroversion.

If due to either of the first two causes, it usually gives little trouble. Frequent micturition may be the only symptom. In the last case the condition is more serious. Usually as the uterus increases in size it breaks free from its vaginal attachment, and then no harm results. If this does not occur, as the uterus grows, the cervix is gradually drawn upwards; the portion of the fundus which is attached to the vagina remains in front of, and below, the level of the cervix, so forming a kind of cul-de-sac, while the posterior uterine wall develops sufficiently to accommodate the child. When labour comes on, the child's head is driven down into this cul-de-sac, instead of against the internal os. The cervix consequently does not dilate, and the uterus may rupture.

Treatment.—Dilate the os, if possible, with Barnes' bags, or incise the cervix, and apply forceps. If this cannot be done, it may be necessary to perform Cæsarean section.

Anteversion.—This condition occurs in the later months of pregnancy in cases of contracted pelvis, and occasionally in pluriparous women. The uterus is pushed upwards, out of the pelvis, by the narrow brim, and falls forward against the abdominal wall, a pendulous abdomen resulting. The condition tends to the production of malpresentation.

Treatment.—Support the abdomen by an abdo-

minal belt or binder, and during labour keep the patient lying on her back until the head fixes.

Retroflexion.—Pregnancy frequently occurs in a retroflexed uterus, and then may terminate in four ways:—

(1) *Abortion*.—This happens very frequently. The retroflexed uterus is subject to endometritis, which favours the occurrence of abortion.

(2) *Restitution*.—As the uterus increases in size, it gradually rights itself, and then pregnancy continues as usual.

(3) *Anterior Development*.—This is a very rare occurrence. It is the reverse of the condition which may result after vaginal fixation of the uterus. The fundus remains bound down in Douglas's pouch, but the anterior uterine wall develops sufficiently to permit the growth of the foetus. There is thus at full term a cul-de-sac behind the cervix, into which the child's head is driven. The treatment in this condition is practically the same as in the case of an anterior cul-de-sac.

(4) *Incarceration*.—This is a serious condition, and, if not relieved (*i. e.* if the uterus is not emptied or replaced), will almost certainly result in the death of the woman. Its occurrence is favoured by the presence of a contracted pelvis, as the overhanging promontory prevents the uterus from rising.

Symptoms.—A tumour which is increasing in size fills the pelvis; the consequent symptoms are all the result of its presence. They are:—pain, constipation, and difficulty in micturition, all of which increase from day to day. One day the patient becomes unable to pass water, her bladder becomes over-

distended, and then the urine dribbles away involuntarily (*ischuria paradoxa*). It is usually while in this condition that she sends for medical aid. On examination of the abdomen, a tumour is felt extending up to the umbilicus, which yields a dull note on percussion. This may put us off our guard. We may think that the tumour is the uterus, while in reality it is the over-distended bladder. On making a vaginal examination, a tumour is felt filling Douglas's pouch and pressing forwards towards the pubes. The cervix is drawn upwards, and pressed forwards, so that it lies above the symphysis, and sometimes it may be impossible to feel it. The urethra is also so drawn up, that it may be difficult to find its orifice in order to pass a catheter.

Treatment.—The condition having been recognised, the first step is to empty the bladder. This is sometimes a matter of great difficulty. If the catheter cannot be passed in the ordinary manner, place the patient in the knee-and-chest position, and then endeavour to pass a flexible gum-elastic male catheter. If this fails, the bladder must be tapped supra-pubically. The next step is to replace the uterus, under chloroform if necessary. If this can be done, a pessary is inserted, and the condition is cured. If repeated attempts fail, abortion must be brought on. Owing to the position of the cervix, it may be impossible to pass any instrument into the uterus. If all attempts fail, the uterus must be tapped with a fine trocar through the posterior vaginal wall, and a portion of the liquor amnii drawn off. This is a certain method of procuring

abortion, and is sufficiently safe if all due aseptic precautions are used. If the condition is left unrelieved, death will be the result. The uterine wall may slough from the continued pressure; the bladder may rupture from over-distension; a very virulent form of cystitis may result from retention of urine; and consecutive nephritis may result from the cystitis. Any of these conditions, in turn, may give rise to septic peritonitis.

Prolapse of the Pregnant Uterus.—Pregnancy, occurring in a uterus which is entirely prolapsed outside the vulva, has been recorded. It is exceedingly rare. The usual condition met with, is one in which the cervix protrudes out of the vagina. This may be due to a hypertrophic elongation of the cervix, accompanied by descent of the uterus, or existing alone. The result of such a condition may be serious. The exposed cervix becomes hypertrophied, its tissue dense and unyielding, and numerous ulcers form upon it. When the patient comes into labour the cervix may not dilate, and rupture of the uterus may then result.

Treatment.—Replace the prolapsed uterus, and insert a ring pessary. If the mucous membrane of the cervix is dense and ulcerated, warm douches, glycerine plugs, and hot baths will help to soften it. If there is no inversion of the vagina, and the cervix alone is prolapsed, Winckel recommends amputation of it in the early months of pregnancy. If the case is seen too late for treatment, the patient must be carefully watched when she comes into labour. If the cervix does not dilate, it may have to be incised, or even a Cæsarean section performed.

CHAPTER XIV.

DISEASES OF THE DECIDUA AND OVUM.

Composition of the Ovum—Hydrorrhœa Gravidarum—Myxoma Chorii—Deciduoma Malignum—Hydramnios—Oligohydramnios—Anomalies of the Placenta and Funis.

THE decidua is the term applied to the outermost covering of the ovum. It is formed from the hypertrophied and altered mucous membrane, which lines the uterus during pregnancy (*v.* page 13). The ovum consists from without inwards of:—the placenta; two membranes,—the chorion and the amnion; the liquor amnii; the umbilical cord; and the fœtus. Each of these structures may be the subject of pathological changes.

THE DECIDUA.

Hydrorrhœa Gravidarum.—This is the term applied to a watery discharge coming from the uterus during pregnancy. It occurs as the result of two separate conditions, and accordingly two varieties are met with:—decidual hydrorrhœa, and amniotic hydrorrhœa. Decidual hydrorrhœa is the term applied to the escape of a collection of fluid which forms between the membranes and the uterine wall. The formation of this fluid is said to be due to an inflammation, and glandular proliferation of the

decidua vera, involving also the decidua reflexa. The exact causation of the inflammation is not definitely known, but it is probably one of the many results of an antecedent endometritis. The result of the inflammation is, that a watery fluid becomes stored up behind the membranes. It remains there until it has filled all the available space, when it comes away with a gush. Several such gushes may occur during pregnancy. In some cases there is no further disturbance, but in others premature labour or miscarriage may result. The first attack may occur at any time after the third month. There is no treatment applicable to the condition during pregnancy. The patient should remain at rest in bed after the flow, especially if it is attended with uterine contractions. She should be warned that abortion or premature labour may occur. After pregnancy is over, and the uterus has returned to its normal condition, any endometritis present should be cured.

Amniotic hydrorrhœa is the term applied to the discharge when it is due to the premature escape of a portion of the liquor amnii—most probably through small tears in the membranes. It is a more serious condition than decidual hydrorrhœa, as premature labour is more likely to follow. It usually occurs in the last couple of months of pregnancy. The treatment is the same as in the decidual form.

THE MEMBRANES.

Myxoma Chorion.—This is the term applied to a peculiar myxomatous degeneration of the chorionic

villi. It is also known as vesicular or hydatidiform mole. The chorionic villi, instead of atrophying, proliferate, and become altered into little cysts which contain mucin. The foetus dies, and is absorbed; while the cysts go on increasing in number, and finally fill the entire uterus. They vary in size from that of a grape to that of a pin's head, and are described as resembling a mass of white currants floating in red currant juice. The change commences before the end of the third month. If it happens to be a twin pregnancy, one ovum alone may be affected.

Varieties.—Two forms are described:—a simple form, in which the degeneration is confined to the ovum; and a malignant form, in which the cysts invade the uterine wall, and perhaps penetrate through it into the peritoneum.

Ætiology.—Little is known as to the direct causation of hydatidiform mole. It occurs particularly in multiparæ, and after chronic catarrh of the mucous membrane (Winckel); I have, however, seen a case in a primipara, and another in a 2-para. It is said to tend to recur in subsequent pregnancies. As it starts in the chorionic villi it can only be the result of conception.

Symptoms.—The subjective and most of the objective symptoms of pregnancy are present, but no foetus can be felt nor foetal heart heard, unless it happens to be a twin pregnancy. The uterus never corresponds in size to the period of pregnancy; it may be smaller, but is usually considerably larger. It feels more tense and more elastic than normal. There is a constant, blood-stained, watery discharge,

in which small cysts may be found. Their presence is, of course, pathognomonic. Constant crampy pains also occur, due to the distension of the uterus or to its effort to expel the mass.

Terminations.—It is a very serious condition. If untreated one of four terminations may follow :—

- (1) Spontaneous expulsion.
- (2) Death of patient from constant loss of blood.
- (3) Death, from rupture of the uterus.
- (4) Death, from peritonitis, caused by perforation of the uterus by the cysts.

Treatment.—Empty the uterus as soon as the condition is recognised. To do this, induce labour by dilating the cervix with Barnes' bags; the mass may then be expelled spontaneously. If this does not occur, introduce the finger, or the hand, and clear out the uterus thoroughly. There will be very free hæmorrhage, whilst this is being done; but, as soon as the uterus is empty, the bleeding will most usually cease. Then douche out the uterus with hot creolin solution. If this does not finally check the hæmorrhage, plug the cavity tightly with iodoform gauze. Never curette in the first instance, as the curette might perforate the uterus with great ease. Frequently, these patients will return after a fortnight or three weeks, on account of a recurrence of hæmorrhage. The uterus should then be curetted thoroughly, as bits of the mole are in all probability left behind. If the malignant form of mole is diagnosed, the uterus must be removed.

Deciduoma Malignum.—This is the term applied

to a malignant growth, which is believed to arise from the epithelial covering of the chorionic villi. It is one of the most rapidly fatal forms of malignant disease known.

Ætiology and Pathology.—As deciduoma malignum is a rare, and only recently described disease, its causation and pathology have not been definitely settled. It has been noticed to occur after delivery, either at or before term, and has been specially found after the expulsion of a hydatidiform mole. In this latter connection it may be noticed that in all probability the fact that this condition had not been described sooner than it was (Sänger, 1889) was due to its being taken for the malignant form of hydatidiform mole.

The growth consists of cells, which are believed to originate in the two epithelial layers which cover the surface of the chorionic villi, viz. :—

- (1) The syncytium, *i. e.* the external layer, which is supposed to be derived from maternal epithelium.
- (2) Langhans' layer, *i. e.* the deeper layer, which is undoubtedly foetal in origin.

The cells derived from the syncytium are opaque, large, and irregular in outline, with several deeply staining nuclei. The cells derived from Langhans' layer are transparent, also large and globular, with only one nucleus, which stains faintly. The growth so formed extends first into the decidua, and then grows out into the uterine sinuses. It thus extends through the uterine wall, but does not grow out amongst the muscle fibre.

A third cellular element is found in association

with the growth :—cells resembling the decidual giant-cells, which are found extending *amongst* the uterine muscle fibres, and which are known as “chorion wandering cells.”

As the growth extends along inside the blood-vessels, portions of it are easily detached and carried away to other organs, especially the lungs. Here they form fresh foci, from which metastatic growths arise.

Symptoms.—The earliest symptom is hæmorrhage, usually profuse, supplemented by a constant, blood-stained, sometimes fœtid, discharge. The condition is usually thought to be due to an incomplete abortion or to the retention of placental fragments causing secondary post-partum hæmorrhage. On exploring the uterus it is found to be enlarged, its cavity more or less filled with soft friable tissue, which cannot be completely removed with the curette. If the disease is far advanced the outline of the uterus will be irregular, and nodules or masses may be felt filling the pelvis. If there is still room for doubt, microscopical examination of a fragment will settle the question.

Treatment.—The fact that the disease sometimes occurs is another reason—if one was wanting—for the early exploration and emptying of the uterus in continued hæmorrhage after abortion. Once the diagnosis is made the treatment consists in the immediate extirpation of the uterus.

Prognosis.—The prognosis is extremely bad, owing to the rapid growth and dissemination of the disease.

THE LIQUOR AMNII.

Hydramnios.—This is the term applied to an excessive quantity of liquor amnii. The normal amount is about two pints; anything over five pints is considered excessive, and the amount may even exceed twenty pints.

Varieties.—Two forms are described:—(a) Acute, coming on in a single night; it is very rare. (b) Chronic, when the fluid accumulates gradually.

Ætiology.—The pathology of hydramnios is very uncertain. It is found associated with syphilis of the child, anencephalus, spina bifida, and twins. It is said, by some, to be due to amnionitis; but it is doubtful if such a condition ever exists.

Terminations.—(1) Premature labour may set in, as a result of the over-distension of the uterus.

(2) In less degrees of distension the patient may go to full term.

(3) The uterus may rupture from over-distension.

(4) The patient may die of failure of the heart, due to the pressure of the enormous uterus.

During labour many complications may occur. The first stage is tedious, due to the over-distension of the uterus, and consequent weakening of the muscle fibres. Malpresentations of the child are common. At the time of the rupture of the membranes, owing to the great rush of water, the child may be swept into a malpresentation, if it is not already one, and the cord may become prolapsed. As a result of the sudden diminution in size of the uterus, the placenta may be detached, and hæmorrhage result. The second stage may be precipitate,

provided the presentation of the child is correct. The third stage, again, is tedious, owing to atony of the uterus; the placenta may be retained, and post-partum hæmorrhage result.

Symptoms.—The symptoms are those of pressure, on the abdominal and thoracic viscera, due to the over-distension of the uterus. Thus, we find:—constipation, from pressure on the rectum; frequent micturition, from pressure on the bladder; pendulous abdomen, from pressure on the abdominal walls; vomiting, from pressure on the stomach; dyspnœa and cardiac palpitation, from pressure respectively on the lungs and heart.

Diagnosis.—The uterus is considerably larger than it ought to be, in proportion to the period of pregnancy. The foetus is felt with difficulty, and it may be impossible to hear the foetal heart,—both owing to the quantity of fluid which lies between the child and the uterine wall. By vaginal examination, nothing can be felt except the bulging membranes, if the patient is in labour.

Treatment.—During pregnancy, support the uterus by an abdominal binder. It may be necessary, rarely, to induce premature labour, owing to the cardiac symptoms. When the patient comes into labour, do not allow the membranes to rupture spontaneously, as most of the troubles that occur are due to the sudden rushing away of the waters. As soon as the os is as far dilated as is considered safe, introduce the hand into the vagina; pass a couple of fingers upwards between the membranes and the uterine wall; then slip a knitting needle or the stilette of a catheter along them, and puncture

the membranes as high up as possible. The liquor amnii will then drain away slowly. Lastly, palpate the foetus, to see if it is lying in a correct position.

Oligo-hydramnios.—In this condition the liquor amnii is insufficient in quantity. As a result, the amnion may become adherent to any part of the foetus. As the latter grows, these adhesions are drawn out into bands, and these bands occasionally encircle the foetal limbs, thus causing intra-uterine amputation, and similar accidents.

THE PLACENTA AND FUNIS.

Anomalies of the placenta in size, shape, or position, and of the cord in length and manner of insertion, are frequently met with. The most important of these are:—

(1) *Placenta Membranacea.*—The placenta is large and greatly thinned out, so that it covers almost the entire internal uterine surface. Retained adherent placenta may be thus caused, as the thin placenta crumples up when the uterus contracts, instead of becoming detached.

(2) *Placenta Succenturiata.*—The placenta, instead of being composed of a single mass, has one or more detached portions, only connected with the placenta proper by means of blood-vessels. These secondary placentæ are very likely to remain behind after delivery, and to cause post-partum hæmorrhage, or sapræmia. If they cause hæmorrhage immediately after delivery, they are discovered, if the uterus is explored. Sometimes they do not

begin to cause symptoms until a day or two after delivery, when secondary post-partum hæmorrhage sets in.

(3) *Battledore Placenta*.—The cord is inserted into the edge of the placenta, instead of into the centre. It is of no clinical importance.

(4) *Placenta Prævia*.—The normal situation of the placenta is on the anterior or posterior uterine wall, with its lower border 2 to 4 inches above the internal os. If any part of it lies "so near the internal os, that it is torn off in the formation of the lower uterine segment," the condition is known as placenta prævia (Winckel). It will be discussed later.

(5) *Insertio Velamentosa*.—In this condition, the placental vessels which form the cord, do not unite upon the surface of the placenta, but run separately for some distance along the membranes. They are thus liable to be torn when the membranes rupture, and so to cause the death of the child.

CHAPTER XV.

ABORTION AND MISCARRIAGE.

Ætiology—Varieties: Threatened Abortion, Cervical Abortion, Missed Abortion, Complete Abortion, Incomplete Abortion—
Diagnosis of Abortion—Miscarriage.

ABORTION.

ABORTION is the term applied to the expulsion of the ovum from the uterus before the complete formation of the placenta, *i. e.* before the commencement of the fourth month.

Ætiology.—The causes of abortion are divided into predisposing and exciting. The former are the more important, as they can be treated and cured in many cases. The latter are of slight importance, as they only tend to cause abortion if the predisposing causes are already present.

The direct predisposing cause in the great majority of cases of abortion is endometritis, which may exist as a primary condition, or may be secondary to some other condition, as:—

- (1) Malpositions of the uterus, especially retroflexion.
- (2) Bright's disease.
- (3) Syphilis.

The exciting cause is usually some sudden or violent movement of the body, as a fall or a fit of

coughing. Anything of this nature will readily bring on abortion, when the endometrium is unhealthy, but will rarely or never cause it in a healthy uterus.

A few exciting causes exist which apparently do not require any antecedent predisposing condition. Pyrexia, if it is sudden, and hyperpyrexia almost invariably, will cause abortion. Those fevers in which the temperature rises suddenly, as scarlet fever or smallpox, are more likely to have this effect than typhoid fever, in which the rise of temperature is gradual. The sudden elevation of temperature kills the fœtus, and the ovum is then expelled. Syphilis of the fœtus acts in the same manner, *i. e.* it causes the death of the fœtus, which is then expelled.

Varieties.—The most satisfactory method of classifying the varieties of abortion is according to the treatment which they require. The following is for this reason a serviceable classification:—

- (1) Threatened abortion:—(a) That does not require active treatment. (b) That requires active treatment.
- (2) Cervical abortion.
- (3) Missed abortion.
- (4) Complete abortion.
- (5) Incomplete abortion.

Threatened Abortion.—When a woman who is in the first three months of pregnancy, commences to bleed, the hæmorrhage may be due to an extra-uterine pregnancy, or to a threatened abortion. The diagnosis between the two conditions will be discussed later. If it is a case of threatened abortion, there

is probably more or less pain of a colicky nature, and, if a vaginal examination is made, the cervix may be found to be somewhat shortened, and the os partially dilated.

Treatment.—According as the hæmorrhage is slight or is severe, so the patient will not or will require active treatment. The question of active treatment is entirely decided by the rate and strength of the pulse, and by the appearance of the patient. It is never possible to say whether a threatened abortion is inevitable or not, unless a portion of it has left the uterine cavity. It is always possible to say whether a patient has lost as much blood as we consider safe. If it is a case which does not require active treatment, we endeavour to stave off the threatened abortion. With this object in view the patient should be kept at rest in bed, until all hæmorrhage and pain have ceased for three or four days. Opium may be given to relieve the pain, and liquid extract of *Hydrastis Canadensis* to check the hæmorrhage. Ergot is not to be recommended. If the dose administered is large enough to have any effect on the hæmorrhage, it will also cause sufficient uterine contraction to increase the risk of the expulsion of the ovum. *Hydrastis* is said to act by causing contraction of the walls of the blood-vessels. At any rate, it does no harm, and is useful as a “placebo,” if one must be given.

If, on account of the hæmorrhage, we believe the case to require active treatment, one of two methods must be adopted:—the ovum must be removed by the finger or a curette; or the vagina must be plugged. These methods are not alternatives; if it

is possible to adopt the first we should do so ; if we cannot adopt it, the second method must be used. If this rule is followed, we shall plug the vagina in somewhat less than one per cent. of cases of abortion requiring active treatment. It is possible to empty the uterus immediately, if the os will admit one finger, or even a curette. The former is to be preferred, as it removes the ovum more completely. Pass as much of the hand as is necessary into the vagina, and one finger into the uterus. Detach the ovum with the finger. Then take the

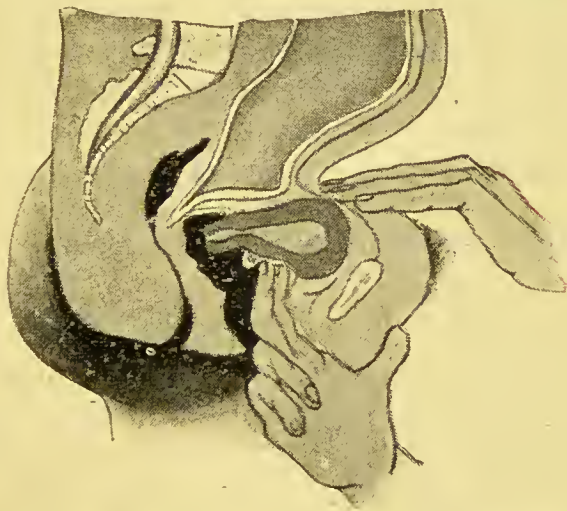


FIG. 20.—Bimanual method of expressing a detached ovum.
(Semi-diagrammatic.)

latter out of the uterus, and place it under the fundus ; *i. e.* in the anterior fornix, if the uterus is normal in position ; in the posterior fornix, if the uterus is retroverted. Sink the other hand into the abdomen, and compress the fundus between the two

hands (*v.* Fig. 20). The ovum is thus driven out of the uterus into the vagina and removed. The uterus should then be well douché with hot creolin solution. If proper aseptic precautions have been used, the case will give no further trouble. If the os is not large enough to admit a finger, fix the cervix with an American bullet-forceps, and curette away the ovum with a Rheinstädter's flushing curette (*v.* Fig. 21). In the small proportion of cases in which the os is not large enough to admit even a curette, and the hæmorrhage is so severe as to require treatment, the vagina must be plugged, with the most careful aseptic precautions. The plug is left in for twelve to twenty-four hours, and then taken out. The os will then be found to be sufficiently dilated to permit the removal of the ovum with the finger, as described above. The



FIG. 21.—Rheinstädter's flushing curette.

dangers of plugging the vagina, unless the plugging is aseptically performed, are considerable, and, even if the plug itself is aseptic, blood may stagnate above it and putrefy. The decomposition then extends to the uterus; and, though the patient seldom actually dies as a result of this, she is frequently left an invalid for years, from tubal disease and pelvic peritonitis.

Cervical Abortion.—This condition occurs when the ovum is displaced from its situation in the uterus, and is displaced into the cervix. The external os does not dilate to allow it to pass, and

the internal os contracts to some extent above it. It is thus retained in the cervix.

Treatment.—Incise the os externum bilaterally, and so make it sufficiently large to allow the passage of the ovum; then, express the ovum in the ordinary manner; and, lastly, stitch up both incisions. One stitch at either side is usually sufficient.

Missed Abortion.—An abortion is said to be missed when the ovum dies, but is not expelled. It may be retained in the uterus for some weeks, or even longer.

Symptoms.—The patient has obviously been pregnant. The uterus has increased to a certain size, but now has ceased to enlarge. The signs of pregnancy disappear, the uterus diminishes in size, and the breasts become flaccid. If the membranes rupture, the foetus becomes putrid and causes a sanious discharge.

Treatment.—Dilate the cervix and empty the uterus with the finger or with a curette.

Complete Abortion.—A complete abortion consists in the coming away of the entire ovum. It requires no special treatment.

Incomplete Abortion.—An incomplete abortion consists in the coming away of any part of the ovum, the remainder being detained in the uterus.

Treatment.—As soon as the condition is recognised, turn the incomplete into a complete abortion, *i. e.* remove what is left behind. If the case is seen immediately after the portion of ovum has come away, and the os is still dilated, attempt to express the remainder of the ovum as directed above. If this fails, and if the os will admit the finger,

introduce it ; then detach the ovum, and express it. If this fails, or if it cannot be performed owing to the contraction of the os, curette the uterus carefully with a blunt Rheinstädter's curette, having previously dilated the cervix if necessary. Never use a sharp curette in these cases, unless they are of long standing and the uterus comparatively firm, as it is very easy to curette away the soft muscle fibres of the latter. Never plug the vagina in the case of an incomplete abortion, as decomposition is certain to occur above the plug. On the other hand it is sometimes very useful to plug the utero-vaginal canal with iodoform gauze, after the uterus has been emptied, in cases of continued hæmorrhage, or where there is decomposition proceeding inside the uterus. The expectant treatment of incomplete abortion is only mentioned to be condemned. It consists in waiting until one of three things happens :—

(1) The remainder of the ovum comes away. This is the most favourable termination, but it is not the commonest.

(2) The ovum decomposes.

(3) The patient loses so much blood, that it is considered inadvisable to allow her to lose any more.

If either the second or third termination occurs, then, and only then, is the uterus emptied. This is extremely bad treatment. It is much more dangerous to remove an ovum which is decomposed, than one which is not. Again, a woman, who is weakened by repeated hæmorrhage, is more liable to become septic, than one who has the normal quantity of blood in her body.

Diagnosis.—The diagnosis between ectopic gestation and abortion will be discussed in the next chapter. I will now consider only the diagnosis of the different varieties of abortion. To enable us to form this diagnosis two points must be attended to:—

(1) The nurse must keep everything that comes away from the patient *per vaginam*.

(2) The doctor must inspect such dejecta carefully, with a view to discovering:—(a) whether the case is one of abortion; and, if so, (b) whether it is complete, (c) or incomplete.

If nothing but blood comes away, the case may be a threatened abortion, or it may be an extra-uterine pregnancy. If either a foetus or chorionic villi are found among the discharged matter, it must be a case of abortion. If the whole ovum has come away, it is a complete abortion; if only a part of it has come, it is an incomplete abortion. In many cases of abortion, unfortunately, everything that has come away has been thrown out by the patient's friends, or by the nurse. Then we have to rely on the history of the patient, and on the results of a vaginal examination. The former is unreliable, and, consequently, we must depend almost entirely upon the latter. Two points will then aid us:—

(1) The shape of the vaginal portion of the cervix.

(2) The continuance of hæmorrhage.

(1) The shape of the cervix varies, according to whether the ovum is in the act of distending the cervix, or whether it has already been expelled. In the first case the cervix is cone-shaped, with the base

of the cone above, *i. e.* in the region of the os internum. This is due to the presence of the ovum in the cervix;—the os internum is dilated, the os externum closed (*v.* Fig. 22). In the second case the cervix

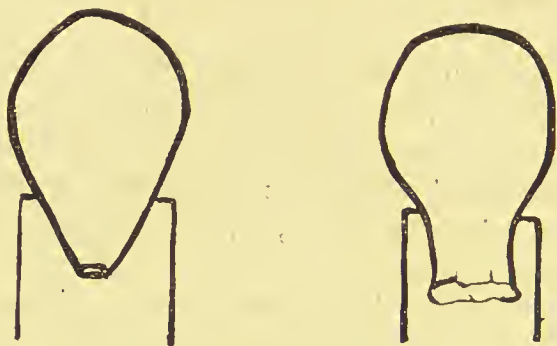


FIG. 22.—Diagram representing the shape of the cervix during, and subsequent to, the expulsion of the ovum.

is cone-shaped with the base of the cone below, *i. e.* in the region of the os externum, and the apex above. This is due to the fact that the os internum has closed again, whilst the os externum is still patulous.

(2) If the hæmorrhage has ceased and the os internum is contracted, the ovum has most likely been expelled. If, on the contrary, the hæmorrhage continues, and, particularly, if there is a sanious discharge, some portion of the ovum must have been left behind. In cases of doubt our treatment is governed by the symptoms. If there is constant bleeding, the uterus must be explored, whether there is an ovum there or not. If there is no hæmorrhage, and we do not know the exact condition present, it is better to wait.

MISCARRIAGE.

A miscarriage or *partus immaturus* is the term applied to the expulsion of the ovum after the placenta is fully formed, but before the fœtus is viable, *i. e.* before the twenty-eighth week. These cases resemble full-term labour, and usually follow its course. Before the fourth month the ovum is almost universally attached to the uterus by vascular adhesions; accordingly, the detachment of any part of it causes free hæmorrhage. The state of affairs differs in cases of miscarriage. The placenta is fully formed, and is the only vascular attachment between the uterus and the ovum. If uterine contractions occur, the os dilates, the membranes rupture, the fœtus is discharged, and the secundines follow. Consequently, hæmorrhage is not a necessary accompaniment of such cases.

Treatment.—The case is treated in the same manner as a full-term labour. The fœtus is born, we wait the usual time for the placenta to follow; if it remains behind, it is expressed, bimanually if necessary, or if that fails removed with the hand.

CHAPTER XVI.

EXTRA-UTERINE PREGNANCY.

Varieties—Primary Forms—Secondary Forms—Ætiology—Before Rupture of the Tube: Symptoms, Diagnosis, Treatment—At the Time of Rupture: Symptoms, Diagnosis, Treatment—After Rupture: Symptoms, Diagnosis, Treatment—Result of Fœtus remaining in the Abdomen—Table showing the Varieties of Extra-uterine Pregnancy and their Treatment.

EXTRA-UTERINE or ectopic pregnancy, is the term applied to the development of the ovum outside the uterus. In the vast majority, if not in all cases, this occurs, at first, in some part of the lumen of the tube. At the commencement, this condition causes no very marked symptoms, but as soon as the ovum becomes too large for the containing tube, the latter ruptures. This *primary rupture*, as a rule, takes place during the second month of pregnancy. If both patient and ovum survive this event, the pregnancy may in some cases continue, still without causing any marked symptoms, until term. In other cases, namely, in those in which after the primary rupture the ovum was discharged between the layers of the broad ligament, a *secondary rupture* of the investing peritoneum may occur, at any time between the twelfth week and full term (Bland Sutton). If the ovum survives until full term, a form of spurious

labour then occurs, the uterus may expel a false decidua, and the fœtus dies.

Varieties.—The following is the usual classification of the varieties of extra-uterine pregnancy met with :—

| | | | | |
|---------------------|---|-----------------------|-----------|--------------------------------|
| I. Primary forms | { | tubal | { | tubo-uterine or interstitial. |
| | | | isthmal. | |
| | | | ampullar. | |
| II. Secondary forms | { | ovarian (?) | { | |
| | | from the interstitial | { | uterine. |
| | | | { | abdominal. |
| | | from the isthmal | { | abdominal. [metric). |
| | | | { | broad ligamentous (meso- |
| | | | { | abdominal. |
| | | from the ampullar | { | broad ligamentous (very rare). |
| | | | { | |
| | | from the ovarian | { | abdominal. |
| | | | { | |

This table requires slight explanation. The primary forms are classified according to the position in which the ovum first takes root and grows (*v.* Fig. 23). The secondary forms are classified according to the locality into which the

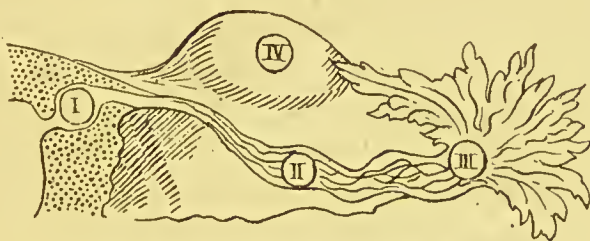


FIG. 23.—Diagram representing the various situations in which a primary extra-uterine pregnancy may develop: (1) interstitial; (2) isthmal; (3) ampullar; (4) ovarian. (Modified from the 'Norris Text-book of Obstetrics.')

growing ovum extends, after rupture of the original site. Thus, a primary tubal pregnancy may, by the

rupture of the tube, extend into the abdominal cavity or between the layers of the broad ligament, according to the part of the tube which ruptures, thus forming a secondary abdominal or secondary broad ligamentous pregnancy. Similarly, by the rupture of an ovarian pregnancy, if such a condition occurs, the ovum may extend into the abdomen, so giving rise, also, to a secondary abdominal pregnancy. In some cases, the ovum may be expelled by the contraction of the tube, without the rupture of the latter, into the uterus in the case of an interstitial pregnancy, into the abdominal cavity in the case of an ampullar pregnancy. This termination is known as tubal abortion.

Ætiology.—The cause of ectopic pregnancy is a matter of much uncertainty. It is believed to be most commonly the result of gonorrhœal salpingitis, —a condition which frequently causes complete obstruction of the tubes, so leading to sterility. It is easy to understand how a lesser degree of inflammation may produce, not complete obstruction, but a partial obliteration of the lumen of the tube. This narrowing may be of such a nature, that it will allow spermatozoa to pass upwards, but will prevent the fertilised ovum from descending into the uterus. The same narrowing might exist in cases in which the obstruction had been complete, but in which, through subsidence of the inflammation, a small lumen was again established. It can frequently be noticed that an extra-uterine pregnancy follows on a lengthy period of sterility.

In discussing extra-uterine pregnancy, I shall refer to tubal pregnancy alone, as it is probably the

only primary variety met with. I shall discuss the symptoms, diagnosis, and treatment under three heads :—

(1) Before,

(2) At the time of,

(3) After primary rupture of the tube.

(1) Before Primary Rupture of the Tube.

Symptoms.—The patient believes herself to be pregnant, and displays all the subjective and objective symptoms of early pregnancy. She has missed one or two monthly periods, and then slight irregular hæmorrhages occur. At the same time she complains of cramp-like pains in the lower part of the abdomen. Most frequently a history of previous sterility can be obtained. On vaginal examination, a tumour is felt at one or other side of, or behind, the uterus, apparently attached to one uterine cornu. It varies in size from that of a hen's egg, to that of an orange. It is unilateral, and is traversed by large blood-vessels, which can be felt pulsating through the vaginal fornix. The uterus is found to be enlarged.

Diagnosis.—The condition has to be diagnosed from a case of threatened abortion, complicated with a sactosalpinx or an ovarian tumour. The marked pulsation of the tumour, the fact that it is unilateral, and the history of the case, are the most important guides. A pyosalpinx is almost always bilateral.

Treatment.—Treat the case as if it was a malignant tumour, and remove it by abdominal section, or vaginal colpotomy, as may be thought best.

(2) At the Time of Primary Rupture of the Tube.

Symptoms.—The first symptoms are those of

internal hæmorrhage,—intense pain and sudden collapse in proportion to the amount of internal hæmorrhage. The pulse is feeble, usually rapid, but on the other hand it may be very slow. The temperature falls to 95° F. or 96° F. At the same time or a little later the uterus usually expels a false decidua, which has been formed synchronously with the growth of the ovum, and there is accompanying hæmorrhage. The succeeding symptoms depend on what has happened, or is actually happening, inside the abdomen. The tube may rupture intra-peritoneally or extra-peritoneally. In the latter case the hæmorrhage usually is soon checked by the pressure of the tissues of the broad ligament, and the symptoms abate; very rarely profuse intra-ligamentous hæmorrhage may occur. The former case—intra-peritoneal rupture—is far more serious. Two terminations are then possible:—

(a) That diffuse hæmorrhage into the abdominal cavity occurs. This is rapidly fatal unless checked.

(b) That a retro-uterine hæmatocele is formed. This is the more favourable termination.

If a vaginal examination is made, at the time of collapse, nothing peculiar is felt. If the existence of a tubal enlargement has been recognised previously, we may be able to determine its disappearance. In cases in which the hæmorrhage is limited by adhesions, a retro-uterine tumour will be felt.

Diagnosis.—The diagnosis has to be made from a threatened, or incomplete abortion, for one of which a ruptured tubal pregnancy is very frequently mistaken. The first point which should attract

our attention, is the extreme disproportion between the condition of the patient, and the amount of *apparent* hæmorrhage which has occurred. The patient apparently has lost only a little blood, but she is anæmic, collapsed, with a feeble pulse, and a low temperature. Then, the decidua, which has been expelled, should be examined. No trace of chorionic villi or of a foetus will be found.

If a hæmatocele forms, it is most important to be able to recognise it. As felt from the rectum, it is a tumour which fills Douglas's pouch, boggy in consistency, and with a dome-shaped upper surface. It invests the rectum, and the uterus can be felt anteposed. It is by recognising the fact that the uterus is anteposed, that a hæmatocele is distinguished from a retroverted pregnant uterus, for which it is most likely to be mistaken. If there is any doubt the sound should be passed, as the result of a false diagnosis would be disastrous. The treatment for a retroverted pregnant uterus is to replace it; whilst any attempt to move a hæmatocele would lead to fresh hæmorrhage, and perhaps directly cause the death of the patient.

Treatment.—This depends upon the nature of the case. If the patient is seen shortly after rupture has occurred, and the condition is recognised as one of diffuse hæmorrhage, there is the great difficulty to contend with, that, on the one hand the hæmorrhage is as far as we know still continuing, whilst on the other hand the condition of the patient is so serious from the amount of blood she has already lost that it would seem as if the shock of an operation would certainly prove fatal. Hence there are

two lines of treatment recommended, both of which have their advocates:—

(1) Immediate laparotomy, in order to secure the bleeding vessels and remove the ruptured tube.

(2) Absolute rest and the free use of stimulants, with the object of rallying the patient from the primary collapse, and then laparotomy if necessary.

If we could determine for certain that the hæmorrhage was continuing or had ceased, then both these lines of treatment would have a proper and definite position. But it is practically impossible to do this, and consequently a choice must be made between them. The first line of treatment is coming more and more into favour, both because in some cases waiting has been attended with disastrous results, and because immediate laparotomy has given a far higher percentage of recoveries than could have been expected from the usual condition in which the patient is found.

If the case is not seen until a hæmatocele has formed, the correct subsequent treatment is also a matter of discussion. Some authorities recommend the abdomen to be opened in all cases, and the hæmatocele to be cleared out. Others wait, on the chance of the hæmatocele being absorbed aseptically, and operate only if a rising temperature shows that suppuration is occurring. This latter is probably the better treatment to adopt in the case of small hæmatocèles. In the case of a large hæmatocele, on the other hand, the danger of putrefaction or suppuration taking place is so tangible that immediate operation is advisable. Also if the pregnancy has reached the fourth month, and conse-

quently there is a placenta and a fairly large foetus, it is better to operate in all cases. If it is decided to operate while the escaped blood is still aseptic, it is probably better to do so by the abdominal route, especially if we have reason to believe that there is a placenta. If, however, suppuration has occurred, the clots, &c., should be cleared out of Douglas's pouch *per vaginam*, without breaking through the limiting adhesions which separate the space in which they are lying from the general peritoneal cavity.

(3) **After Primary Rupture of the Tube.**

As I have shown above, certain consequences may follow the primary rupture of the tube. These are:—

- (1) The patient may die, as a result of the hæmorrhage.
- (2) The ovum may die, and be absorbed, or may be removed at the time of operation.
- (3) The ovum may survive the rupture and continue to develop.

The last case most frequently happens in extra-peritoneal rupture of the tube. It more rarely occurs in cases of intra-peritoneal rupture. It is with this condition we are now concerned; that is, the symptoms and treatment of a case of extra-uterine pregnancy, in which the ovum survives the primary rupture of the tube.

Symptoms.—When the ovum escapes into the broad ligament after primary rupture of the tube, and survives that event, the condition is known as a *mesometric* pregnancy. The peritoneum which forms the broad ligament now occupies the relation-

ship to the ovum which the tube formerly did, and consequently as the ovum grows it is liable to share the same fate, *i. e.* secondary rupture may occur. The immediate effect of this secondary rupture largely depends upon the site of the placenta. If the latter is situated at the top of the gestation sac, *i. e.* above the foetus, this rupture will almost certainly involve it, and, if the patient is in the latter half of pregnancy, cause the most profuse hæmorrhage and death (Bland Sutton). If the placenta lies beneath the foetus the latter can escape into the abdomen when rupture occurs without necessarily causing very profuse hæmorrhage. The symptoms of secondary rupture are practically the same as those of primary rupture.

If secondary rupture does not take place, there are no special symptoms to call attention to the condition of affairs until full term is reached. As soon as this occurs, spurious labour may set in, and the uterus may expel a decidual cast of itself, and the child dies. The patient notices nothing further for a few weeks, when she may begin to think that she is past her proper time for delivery. She also notices that her abdomen is smaller, a change which is due to the absorption of the liquor amnii. If the condition is not relieved, the abdomen continues to decrease in size, and the patient at the same time gradually becomes weaker. She suffers from various subjective sensations, such as a bad taste in the mouth, nausea, shiverings, and pains in the abdomen.

Diagnosis.—It is a very difficult matter to decide, for certain, in the later months of pregnancy,

whether the ovum is contained in the uterus or in the abdomen. It is almost impossible to distinguish between the uterus and the extra-uterine ovum, owing to the distension of the abdomen; and there is an obvious objection to the use of the sound. It is said that the absence of the painless contractions of the uterus as felt by the hand, and of the uterine souffle, are points of importance. But inasmuch as the woman has no symptoms which call attention to her condition before the normal period of termination of pregnancy, she is seldom sufficiently carefully examined to bring into notice these small points. Consequently, the diagnosis is most usually not made until it is obvious that she is considerably past her normal time for delivery. Then, the diminished size of the ovum may allow the uterus to be felt as a separate tumour. The introduction of the sound determines the diagnosis; this is now permissible, as the child is dead, and the patient must be delivered, whether the pregnancy is intra- or extra-uterine.

Treatment. — If secondary rupture occurs, the abdomen must be immediately opened, with the object of checking the hæmorrhage and removing the fœtus. If the placenta was lying above the fœtus, and was involved in the rupture, the death of the patient would probably have occurred before assistance could be obtained. If secondary rupture does not occur, the fœtus and placenta must still be removed; the only question is, when shall the operation be performed? If the nature of the case is recognised before the death of the fœtus, are we to endeavour to save the latter? The general opinion

is, that it is better not to regard the life of the child in these cases, but to consider only the mother. Children developed outside the uterus are usually weak and likely to die, even if extracted alive; whilst the danger of the death of the mother from hæmorrhage, if the operation is undertaken at full term, is very great. The best rule to follow is this. If the case is recognised whilst the placenta is still small, *i. e.* in the fourth, fifth, or sixth month, operate at once. If, on the other hand, the condition is not discovered until near full term, it is better to wait for a month, or even two, after full term, and then operate. By this time the maternal blood-vessels, which supply the placenta, have diminished in size, and there is less risk of hæmorrhage. For the details of the operation itself, I refer the reader to one of the large text-books on obstetrics. It is one of the most difficult operations met with in abdominal surgery. The chief troubles are the difficulty of dealing with the placenta, and the separation of the numerous adhesions, which form, in some cases, between the child and the intestines. It suffices to say here, that, if possible, the placenta must be removed, as there is the gravest risk of its decomposing if left behind.

Terminations.—Cases of extra-uterine pregnancy, which have advanced to full term, if untreated, may terminate in several ways. The foetus may undergo :—

- (1) Maceration, mummification, calcification, saponification; or
- (2) Suppuration

If any of the terminations in the first group

occur, the child may be carried by the mother in her abdomen for years. A *lithopædion* is the term applied to the condition that arises, when the membranes become the seat of calcareous deposits. The mother's health is always interfered with at first, probably owing to absorption from the dead child. Afterwards, as the foetus becomes dried up, it only causes inconvenience by its size and weight. If the foetus decomposes or suppurates, the result is very different. A general suppurative peritonitis may start, and cause the death of the patient; or a localised abscess may be formed. In the latter case, the abscess bursts, either externally, or into one of the hollow viscera. It will continue discharging, perhaps for years, until either the patient dies of exhaustion or amyloid disease, or the entire ovum is discharged piecemeal. She may then recover, but such cases are rare.

The accompanying table may be of some use to the student, in understanding this complex subject (v. the next page).

| An extra-uterine pregnancy is most frequently | If untreated, this condition will terminate, before the end of the third month, in | This termination may cause respectively | If this resultant condition is untreated it will terminate in | The best line of treatment consists in |
|---|--|--|--|--|
| Tubal . . | (a) Intra-peritoneal rupture. | { (a) Diffuse hæmorrhage into the peritoneal cavity. (b) The formation of a retro-uterine hæmatocele. (c) Slight hæmorrhage, the ovum surviving. | The death of the patient. { (a) Aseptic absorption. (b) Suppuration. Full-term extra-uterine pregnancy. | Immediate laparotomy, and ligation of bleeding vessels. Rest in bed. Laparotomy and evacuation of the septic clots. Laparotomy after term, and removal of the fetus. Immediate laparotomy, and ligation of the bleeding vessels. |
| | (b) Extra-peritoneal rupture. | (a) Profuse hæmorrhage into the tissues of the broad ligament, extending sub-peritoneally. | The death of the patient. | Rest in bed. |
| | | (b) The formation of a hæmatoma. (c) Slight hæmorrhage, the ovum surviving. | Aseptic absorption. { Full-term extra-uterine pregnancy. Secondary rupture. | Laparotomy after term, and removal of the fetus. Immediate laparotomy. |

CHAPTER XVII.

ANTE-PARTUM HÆMORRHAGE.

Varieties—Hæmorrhage during fourth, fifth, and sixth months—Accidental Hæmorrhage: Ætiology, Varieties of Accidental Hæmorrhage—Concealed Accidental Hæmorrhage: Symptoms, Treatment—External Accidental Hæmorrhage: Symptoms, Diagnosis, Treatment by plugging the Vagina, Other Modes of Treatment—Unavoidable Hæmorrhage: Ætiology, Varieties, Symptoms, Diagnosis, Treatment by Braxton Hicks's Method, Other Modes of Treatment—Fœtal Mortality in Ante-partum Hæmorrhage.

ANTE-PARTUM hæmorrhages due to rupture of the vascular connections between the fœtus and the uterus can be divided into three main classes, according to the period of pregnancy at which they occur :—

- I. Hæmorrhages occurring during the first three months, *i. e.* before the full formation of the placenta.
- II. Hæmorrhages occurring during the second three months.
- III. Hæmorrhages occurring in the last four months.

I. This class has been already discussed (*v.* page 164).

II. Hæmorrhage coming on during the fourth, fifth, and sixth months of pregnancy is not of very

common occurrence. When it does occur it is sometimes most difficult to treat.

Ætiology.—The hæmorrhage may be due to:—

(1) Detachment of the placenta.

(2) Degeneration of the ovum.

(1) From a theoretical point of view these cases could be subdivided, as will be done in Class III, into hæmorrhage due to the detachment of a normally or of an abnormally situated placenta. But from a practical point of view such a division is useless, as it is impossible to distinguish between them prior to the expulsion of the ovum. Accordingly, although this distinction must be taken into account in considering the ætiology of the hæmorrhage, from the point of view of the treatment of the case it is of no importance.

The detachment of the placenta may be due to:—

(a) Abnormally low insertion.

(b) Nephritis.

(c) Syphilis.

(d) Endometritis.

(2) Under this head are found as causes of hæmorrhage—

(a) Myxoma chorii.

(b) Missed abortion, with the formation of a carneous mole.

The symptoms and treatment of the former have been already referred to (*v.* page 155).

Symptoms.—The symptoms vary, according to the condition of affairs present. In some cases the bleeding occurs constantly but in small quantities, in other cases it comes at intervals in gushes, or most rarely it may occur as a single attack of

flooding, which, if not checked, will kill the patient. Again, the fœtus may die as a result of the placental detachment, if large in extent, or on the other hand its growth may continue. Lastly, the hæmorrhage may be to a large extent internal, *i. e.* intra-uterine, or it may be almost entirely external. Accordingly we find that when the fœtus is dead, if the hæmorrhage is external the uterus gradually diminishes in size owing to the absorption of the liquor amnii; if the hæmorrhage is internal it may increase in size to a marked extent, owing to the retained blood. If the fœtus does not die the uterus will increase in size only in proportion to the rate of fœtal growth if the hæmorrhage is external; but if there is considerable internal hæmorrhage the uterus will become considerably larger than it ought to be for the period of pregnancy.

As might be expected, then, we find that in the majority of these cases the size of the uterus does not correspond to the period of pregnancy—it is usually larger, but may be smaller, resembling the condition found in hydatidiform mole. The cervix is usually soft, and will admit the tip or the whole of finger. The uterus is soft, unless the amount of internal hæmorrhage is very great, when it may be very hard. If the fœtus has been dead for any length of time, or if there is much blood in the uterus, it will be difficult to feel the former *per vaginam*. If decomposition occurs inside the uterus there will be a fœtid discharge and the usual symptoms of sapræmic infection. In proportion to the amount of hæmorrhage the patient will become progressively more anæmic and weaker.

Diagnosis.—The diagnosis of the condition of affairs present can be rarely made without exploring or emptying the uterus. As this proceeding of necessity will terminate the pregnancy, the question to be determined is not so much the exact condition of affairs present as whether it is necessary to empty the uterus or not.

Treatment.—If the hæmorrhage is slight, palliative treatment is adopted, the main essential of which is rest in bed. Various drugs have been recommended, hydrastis, small doses of ergot, strychnine, &c. They are of questionable value, but may be tried.

The conditions under which our treatment must become active are:—

- (1) If it is obvious that the patient has lost as much blood as is advisable.
- (2) If the discharge is fœtid.
- (3) If the fœtus is obviously dead (*v.* page 28).

Under these circumstances the uterus must be emptied.

If the indication for delivery is hæmorrhage and there is no intra-uterine decomposition, the simplest line of treatment consists in passing as many sea-tangle tents into the cervix as there is room for, choosing several small tents in preference to a couple of large ones, and then applying a firm vaginal plug below them. The plug and tents are removed in twenty-four hours, when in some cases the uterus will expel its contents of its own accord, in others the process must be hastened by bringing down a foot.

If the discharge is fœtid, it is advisable to empty

the uterus at once after rapid dilatation of the cervix, and not to lose time in gradual dilatation. With the patient under an anæsthetic dilate the cervix with Hegar's dilators to a sufficient size to admit one finger. Then feel for a foot, with the finger in the uterus, and bring it down into the vagina—if necessary after further dilation of the cervix with the fingers. Gentle traction is then made on the leg. If the fœtus is small it can be delivered at once, if in the sixth month the proceeding will take some little time.

In cases in which it was found advisable to deliver the fœtus without waiting for dilatation of the cervix by tents, and in which pregnancy had not advanced much beyond the commencement of the fifth month, the author has derived considerable assistance from the use of Schultze's spoon forceps. This is passed into the uterus, after preliminary dilation of the cervix with Hegar's dilators, and the foot of the fœtus seized and pulled upon. It comes down a little way and then usually breaks. Then a fresh grip is taken higher up, and the fœtus again pulled down, and so on until finally the head is brought out, crushed if necessary, by the spoon forceps. The child is thus rapidly extracted, and with a minimum dilatation of the cervix.

If, after the fœtus is removed, the placenta does not follow, it must be taken away with the fingers. If after this the uterus does not contract well, and there is still hæmorrhage, it must be plugged with iodoform gauze. This latter proceeding is also advisable in cases in which the placenta or membranes were decomposed.

III. Hæmorrhage coming on in the last four months of pregnancy occurs as two distinct varieties :—

- (1) Accidental hæmorrhage.
- (2) Unavoidable hæmorrhage, or hæmorrhage due to placenta prævia.

ACCIDENTAL HÆMORRHAGE.

Accidental hæmorrhage is the term applied to the hæmorrhage which results from the detachment of a normally situated placenta.

Ætiology.—Accidental hæmorrhage is due to almost the same factors as abortion. It is primarily due to an endometritis, which may exist *per se*, or may be caused by a variety of conditions, of which perhaps the most constant is nephritis. If a patient suffers from endometritis, any sudden movement may cause the detachment of the placenta, and so hæmorrhage may commence.

Varieties.—There are two varieties of accidental hæmorrhage :—(1) concealed, (2) external. These differ from one another in the conditions which permit of their occurrence, and in the treatment which is suitable for them.

Concealed Accidental Hæmorrhage.—This is perhaps, with the exception of acute sepsis, the most serious accident to which pregnant women are liable. It is, happily, very rare. In this condition, the blood which is poured out from behind the detached placenta is stored up in the uterus, which dilates in order to make space for it. The patient can thus bleed to death, although no blood escapes

into the vagina ; but it is only a uterus which is the subject of advanced metritis which will dilate to this extent before the blood-pressure. It is an obvious fact that blood can escape from a ruptured vessel into any cavity only so long as the pressure inside the cavity is less than the blood-pressure. If the escaping blood flows out of the cavity as quickly as it flows in, then an indefinite amount can be lost. If the blood cannot escape, then it must cease flowing as soon as the cavity is full. There is no room for any considerable quantity of blood to escape into a uterus, the muscle-fibre of which has its normal tone, *i. e.* is "healthy," occupied by an unruptured ovum. If a vessel ruptures in such a case, and no blood escapes through the os, the pressure in the uterus would rapidly become equal to the blood-pressure, and the hæmorrhage would cease. If, on the other hand, the muscle-fibre of the uterus is diseased, and dilates before the blood-pressure, then the amount of the hæmorrhage is only limited by the dilatability of the uterus.

This is an important fact to grasp thoroughly, as it shows :—

- (1) How concealed hæmorrhage occurs.
- (2) The method by which external accidental hæmorrhage in a "healthy" uterus may be checked.
- (3) How useless it would be to adopt this same method in concealed accidental hæmorrhage, *i. e.* in the case of a diseased uterus.

Symptoms.—The symptoms of concealed accidental hæmorrhage are those common to any form of internal hæmorrhage. Collapse, falling tempera-

ture, weak and rapid pulse, severe abdominal pain, anæmic appearance,—all occur in proportion to the amount of blood which the patient is losing. At the same time the uterus increases in size, becomes tender to the touch, and there is an increasing difficulty in feeling the foetus.

Treatment.—The only treatment which is of any avail for those cases occurring before the onset of labour is *accouchement forcé*, or Porro's operation.

Accouchement forcé consists in rapidly dilating or incising the cervix, turning the presentation into a footling presentation if it is not one already, and then extracting the child by applying traction to the leg. If the hæmorrhage continues, the uterus must be plugged.

The choice between the two lines of treatment depends largely upon the skill and experience of the practitioner, and upon the circumstances under which the operation has to be performed. In a hospital, where all the requisites for abdominal section are present, Porro's operation is the better line of treatment.

If labour has commenced the hæmorrhage will probably be checked, as in external accidental hæmorrhage, by rupture of the membranes accompanied by massage of the uterus. If this is not successful, and if the hæmorrhage still continues, the foetus must be extracted.

External Accidental Hæmorrhage.—This is also a very serious complication of pregnancy, although the prognosis is not nearly so bad as in concealed hæmorrhage. Usually the blood escapes from the uterus as rapidly as it flows out of the ruptured

vessels, and so the hæmorrhage is at once apparent. On the other hand, in many cases there is first a certain amount—greater or less as the case may be—of concealed hæmorrhage, which changes into external hæmorrhage as soon as the intra-uterine pressure becomes sufficiently great to overcome the resistance to the escape of blood. The amount of internal hæmorrhage which takes place before the external hæmorrhage commences, affords good evidence of the condition of the uterine muscle-fibre. If external hæmorrhage does not come on, either the bleeding ceases owing to the increased intra-uterine pressure, or the case persists as one of internal hæmorrhage.

Symptoms.—The escape of blood is the most prominent symptom, accompanied or preceded by a varying degree of pain in proportion to the amount of concealed hæmorrhage which has, or is, occurring. If the case is not treated, the usual symptoms of hæmorrhage follow.

Diagnosis.—The diagnosis has to be made from hæmorrhage due to placenta prævia, and, as a rule, it is easy to do so. Examine the patient vaginally; if the placenta can be felt through the os, or through the lateral fornices, it is a case of placenta prævia. If the placenta cannot be felt, it may possibly be a case of lateral placenta prævia, but it is to be treated as if it was a case of accidental hæmorrhage. The condition may also be diagnosed by abdominal palpation. If the head is found to be fixed in the brim, it is almost certainly not a case of placenta prævia.

Treatment.—The treatment, and to a great extent

the gravity of the case, depend upon whether the patient is having strong uterine contractions or not. If she is, the danger of the condition is greatly diminished, and the treatment is simple. If she is not, the reverse is the case. I pointed out above, the conditions under which concealed hæmorrhage occurs; and I also showed that there was no room for blood to be stored up in a "healthy" uterus if the ovum was intact. It is on this fact that the treatment which I am about to describe depends.

If we prevent the blood, which is escaping from behind the placenta, from leaving the uterus, the pressure inside the latter will rapidly become greater than the blood-pressure, and, as a result, the hæmorrhage will cease. How, then, can the escape of blood from the cervix be prevented? By plugging the vagina tightly, and so compressing the cervix. This will check the hæmorrhage, and at the same time bring on labour—the two results which we most wish for under the circumstances. At the same time labour is brought on gently, without causing any aggravation of the shock from which the patient is usually suffering. On the contrary, she is given ample time to rally from the collapse which the hæmorrhage caused, before the uterus empties itself.

To perform the operation of plugging, place the patient in the cross-bed position, wash and douche her thoroughly. Anæsthesia is not absolutely necessary, but is a great advantage. Then pass a posterior speculum, and with strips of iodoform gauze, soaked in lysol solution (0·5 per cent.), plug tightly round the cervix. The rest of the vagina is then plugged,

as firmly as possible, with balls of absorbent wool about the size of a large walnut, also soaked in lysol solution. The plugging is continued until the vagina is as full as it will hold. The patient is then put back to bed, and a tight abdominal binder applied in order to increase the intra-uterine pressure by compressing the fundus, and to increase the force with which the vaginal plug is compressing the cervix by driving the uterus down into the pelvis. The wadding which is used should have been previously boiled for five or ten minutes. The plug is left in until strong labour pains ensue, this usually occurring in from three to four hours. In some cases the onset of labour may be slower than this, and then the plug must be removed after twelve hours, for fear of decomposition. If the hæmorrhage comes on again, the plugging must be repeated, but this is usually unnecessary. The success of this treatment depends upon three points:—

- (1) The uterus must be "healthy."
- (2) The ovum must be intact.
- (3) The plug must be applied tightly.

If the patient is in strong labour at the time the hæmorrhage commences, it is not a difficult matter to check the latter. If the membranes are intact, rupture them. This enables the uterine contraction to continue without at the same time causing traction on the placenta, and so detaching more of it. Also, owing to the escape of the liquor amnii, the uterus is enabled to contract down upon the child, and thus to diminish the size of the placental site. If the hæmorrhage continues, the vagina may still be plugged, as the presence of uterine contractions ensures the

obliteration of the space formerly occupied by the liquor amnii, and hence there will be no room for intra-uterine hæmorrhage; or the fœtus may be delivered, if the os is sufficiently dilated, by version followed by extraction, or, if the head is fixed, by the application of the forceps.

Other Modes of Treatment.—Other modes of treatment, which are recommended, are :—

(1) Rupture of the membranes in every case. This is good treatment if we can be certain that the uterus will subsequently contract down upon the child. But we cannot be certain of this, unless the patient has strong labour pains. It should, therefore, be reserved for such cases.

(2) *Accouchement forcé.* This is exceedingly bad treatment. If the patient has lost much blood, she is in danger of dying of cardiac failure. Any intra-uterine manipulations increase this tendency, particularly if they are followed by the forcible extraction of the child. The only point in favour of this treatment is that it gives a lower infantile mortality. This point will be referred to again (*v.* page 204).

PLACENTA PRÆVIA.

By placenta prævia is meant the implantation of the placenta so near the internal os that a portion of it is separated during the formation of the lower uterine segment (Winckel).

Ætiology.—The cause of placenta prævia is not very definitely known. Three theories as to its occurrence are worthy of consideration :—

(1) That, owing to an antecedent endometritis; the cavity of the uterus is enlarged, and its walls are not in as close contact, one with the other, as is normal. As the result of this, when the ovum enters the uterus, instead of being detained in the neighbourhood of the Fallopian tube, it drops down, and becomes implanted in the lower uterine segment.

(2) That a part of the placenta is formed out of the chorionic villi which are inserted into the lower part of the decidua reflexa, instead of being confined to those which are inserted into the decidua serotina (Hofmeier and Kaltenbach).

(3) That a placenta prævia is merely a normally situated placenta which, owing to its size, has invaded the lower uterine segment.

Whatever may be the actual cause of the condition, there is little doubt that endometritis plays an important part in it.

Varieties.—Three varieties of placenta prævia are described:—

(1) *Placenta prævia centralis*; in which the placenta covers the entire undilated internal os.

(2) *Placenta prævia marginalis*; in which the placenta comes down to the edge of the undilated internal os.

(3) *Placenta prævia lateralis*; in which a portion of the placenta lies in the lower uterine segment, but does not descend so far as the undilated internal os (v. Fig. 24).

Symptoms.—The chief symptom is hæmorrhage, occurring any time after the commencement of the seventh month. If the hæmorrhage continues un-

treated there will be the usual symptoms of collapse.

Diagnosis.—The diagnosis is made by examining the patient vaginally. If the placenta is felt through the os or through the lateral fornix, it is a case of placenta prævia. If the placenta cannot be felt,



FIG. 24.—Diagram representing the various situations of the placenta.

A. Normal situation. B. Placenta prævia centralis. C. Placenta prævia marginalis. D. Placenta prævia lateralis. (Modified from 'The Norris Text-book of Obstetrics'.)

then it is either a case of accidental hæmorrhage or of hæmorrhage due to a placenta prævia lateralis; in either case the treatment to be adopted is that of accidental hæmorrhage. In a favourable subject the occurrence of placenta prævia may be diagnosed by abdominal palpation. The points to be looked

for are:—the high situation of the presenting part, and an increased sense of resistance and an increased difficulty in feeling the foetal parts over any one portion of the lower uterine segment.

Treatment.—As soon as the diagnosis of placenta prævia is made the case should be treated. As in accidental hæmorrhage, the treatment depends on whether the patient is, or is not, in labour. Usually she is not in labour at the onset of the hæmorrhage, and in this case the prognosis is considerably more serious. The best treatment then is that recommended by Braxton Hicks. It consists in turning the foetus by bipolar version into a breech presentation, rupturing the membranes, drawing down a foot (*v. p* 311), and leaving the rest of the delivery to nature. If it is a case of central placenta prævia, the fingers must be pushed directly upwards through the placenta in their attempt to seize the foot. This treatment both checks the hæmorrhage, by the pressure of the breech or back of the child against the placenta, and brings on labour. A piece of gauze should be tied to the foot; and, if further hæmorrhage occurs, light traction on the gauze will check it, by drawing down more of the breech. This treatment requires two conditions to be present:—

- (1) The membranes must be unruptured.
- (2) The os must be large enough to admit at least two fingers.

The first condition is practically always present, unless, indeed, an ignorant attendant has ruptured the membranes. The second condition is present in more than 99 per cent. of all cases of placenta prævia in which the patient is bleeding. In the rare instance

in which it is not present, plug the vagina and leave the plug in for a few hours. The os will then be found sufficiently dilated to allow version to be performed.

If the patient is getting strong labour pains when the hæmorrhage commences, rupture of the membranes is often sufficient to check the bleeding. Rupture of the membranes acts in the same way, in these cases, as it does in accidental hæmorrhage in the presence of strong labour pains;—viz. it allows the head to advance without detaching more of the placenta, and the placenta to retract upwards with the lower uterine segment, and it diminishes the size of the placental site (*v. p.* 197). If the hæmorrhage still continues, the child may be delivered by the forceps, if the head is fixed, and the os dilated. If these conditions are not present, the child may be turned by internal version, and the rest of the delivery left to nature.

Other Modes of Treatment.—Other modes of treatment recommended are :—

(1) Champetier de Ribes' bag. This method is recommended by Dührssen, and lately by Blacker of London, in a monograph on the subject. It consists in introducing Champetier's hydrostatic dilator—a pear-shaped rubber or waterproof silk bag—into the amniotic cavity, after rupture of the membranes. The bag is then distended with water, and acts in the same manner as does the breech in Braxton Hicks's method. The advantages claimed for this method are the ease with which it is carried out, and the improved foetal prognosis. Its disadvantages appear to be :—that in careless hands

sepsis is more likely to be caused than by Braxton Hicks's method, inasmuch as a foreign body—possibly non-sterile—lies in the uterus for some hours ; and that it requires a special apparatus, and, moreover, one which is extremely liable to be damaged by keeping, and hence to be useless when required.

(2) *Accouchement forcé*. The same objection applies to the adoption of this treatment in the case of placenta prævia, as does to its adoption in accidental hæmorrhage (*v. p.* 198).

(3) Plugging the vagina. There is a very considerable risk of sepsis in any case of plugging, more particularly in placenta prævia, owing to the low situation of the placenta. It should not be resorted to unless it is absolutely necessary.

(4) Partial detachment of the placenta—Barnes' method. The patient runs a greater risk of sepsis, if this method is adopted, than if version is adopted. In performing it the fingers of necessity come into very close contact with the uterine sinuses, and bacteria may be introduced if the strictest asepsis is not adopted.

Complications.—Patients suffering from placenta prævia are more liable to post-partum hæmorrhage and to sepsis than are others. The former frequently occurs, owing to the fact that the lower uterine segment does not contract as firmly as the fundus, consequently the uterine sinuses may be only partially obliterated. If rapid dilatation of the cervix and extraction are the treatment adopted, deep lacerations of the cervix are almost certain to occur. The cervix and the lower uterine segment tear very much more easily in cases of placenta prævia than

in cases of normal insertion of the placenta. It thus frequently happens that, while we think the os is dilating under the pressure of our fingers, it is really tearing. Again, a laceration of the cervix which would be trivial in the case of a normally situated placenta, may cause grave trouble in placenta prævia, owing to the large vessels in the neighbourhood of the cervix which supply the placenta. There is also more risk of sepsis in these cases. The placental site lies so near the vagina, that if any putrefaction occurs in the latter, the former is almost certain to become infected.

Fœtal Mortality.—It is well said that, in any case of ante-partum hæmorrhage, the life of the child must be considered as antagonistic to the life of the mother. Any treatment which yields the smallest fœtal mortality will give the largest maternal mortality, and *vice versa*. Thus, in both accidental and unavoidable hæmorrhage, *accouchement forcé* will save the greatest number of children; but it will lose from six to twelve times as many mothers as will the treatment by plugging in accidental hæmorrhage, or by bipolar version in placenta prævia. Even if the child is brought into the world alive in either of these conditions, it is most frequently premature and weak from its previous semi-asphyxia. As a result, it most frequently dies within the first month. Under these circumstances, the life of the mother should not be risked by adopting a treatment which is avowedly more dangerous for her, merely because it affords a slightly improved chance of saving the child.

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CHAPTER XVIII.

POST-PARTUM HÆMORRHAGE.

Primary Post-partum Hæmorrhage—Varieties—Traumatic Post-partum Hæmorrhage: Diagnosis, Treatment—Atonic Post-partum Hæmorrhage: Ætiology, Treatment, Plugging with Iodoform Gauze, Injection of Perchloride of Iron—Concealed Hæmorrhage—Secondary Post-partum Hæmorrhage: Ætiology, Treatment—Post-hæmorrhagic Collapse—Transfusion of Saline Solution. *3½ pints ad 100 f.*

THE term post-partum hæmorrhage is, for convenience' sake, applied to any hæmorrhage which occurs after the birth of the child, irrespective of the fact that parturition may, or may not, be complete. It is divided into two classes, according to the time at which it occurs:—

- (1) Primary post-partum hæmorrhage.
- (2) Secondary post-partum hæmorrhage.

PRIMARY POST-PARTUM HÆMORRHAGE.

Primary post-partum hæmorrhage is the term applied to hæmorrhage occurring within six hours after delivery.

Varieties.—There are two varieties:—

- (1) Traumatic.
- (2) Atonic.

Traumatic Post-partum Hæmorrhage.—This is the term applied to hæmorrhage resulting from a laceration of some part of the genital canal. There are

two situations in which a laceration is likely to cause hæmorrhage; these are,—in the neighbourhood of the clitoris, or in the cervix.

Diagnosis.—The diagnosis has to be made from atonic post-partum hæmorrhage, that is hæmorrhage due to the failure of the uterus to contract. This is easily accomplished by placing the hand on the fundus; if the latter is firm and well contracted it is obvious that the hæmorrhage cannot be due to the failure of the uterus to contract, *i. e.* it must be traumatic hæmorrhage. In some cases the diagnosis may not be made until we have commenced to douche the uterus. If a Bozemann's return catheter is used for this purpose, it at once distinguishes between the two conditions. In the case of hæmorrhage from the interior of the uterus, the solution which flows back through the return pipe of the catheter will be blood-stained. If the hæmorrhage is from a laceration outside the uterus, the solution in the return pipe will be colourless, whilst at the same time blood is seen to flow from the vagina or vulva.

Treatment.—If traumatic hæmorrhage is suspected, examine the region of the clitoris. If there is a laceration which is bleeding, it must be stitched. Pass a silk ligature by means of a small curved needle deeply under one end of it, going right down to the bone, and a second ligature at the other end. Tie them tightly, and the hæmorrhage at once ceases. The ligatures must be removed in six or seven days. If, on inspection, no laceration can be detected about the clitoris, we must examine the cervix. To do this draw the latter down with a bullet forceps, if there is one to hand, and

examine it carefully for a laceration or bleeding vessel. A laceration must be stitched up, a bleeding vessel must be tied. If no bullet forceps is to hand with which to draw down the cervix, an equivalent can be extemporised by means of a ligature. Thread a curved needle with a long ligature, and pass the needle held in a needle-holder up to the cervix under cover of the fingers in the vagina. Then pass the needle through the first part of the cervix that comes to hand, and draw it through, leaving the ligature *in situ*. By means of the latter the cervix can be drawn down and exposed. Pressure upon the fundus, by causing descent of the uterus, is also of great assistance.

Atonic Post-partum Hæmorrhage.—This condition is due to failure of the uterus to contract and retract. It may occur either as an external hæmorrhage or as an internal or concealed hæmorrhage. The former is very much the more common. The latter is only possible under a radically bad management of the third stage.

Ætiology.—Before entering into the causes of atonic hæmorrhage, it is well to understand what it is that normally prevents the occurrence of hæmorrhage after the detachment of the placenta. This end is brought about by three factors:—

(1) The contractions of the muscular coat of the uterus.

(2) The retraction of the muscle-fibres of the uterus.

(3) The clotting which occurs in the mouths of the vessels.

I have explained the difference between contrac-

tion and retraction before (*v.* page 36), and also that the former is intermittent, the latter continuous. The latter is therefore the more important. We may, then, attribute the non-occurrence of post-partum hæmorrhage to the permanent retraction of the uterine fibres which takes place after the child is expelled. The contractions of the uterus will check all hæmorrhage during the period of contraction, but retraction, once established thoroughly, prevents the occurrence of any further hæmorrhage. The third means by which hæmorrhage is checked is of little or no importance, *i. e.* the clotting of blood in the open mouths of the vessels. It is probably the result of the checking of the hæmorrhage, and not the cause of it.

We can now understand the causes of atonic post-partum hæmorrhage. Considered generally, they are anything which interferes with the due retraction of the uterine muscle-fibres. They are as follows :—

(1) Retained placental fragments, membranes, or blood-clots, *i. e.* bad management of the third stage of labour.

(2) Uterine inertia.

(3) Over-distension of the uterus, as in hydramnios or twins.

(4) Metritis.

(5) Protracted labour.

(6) Precipitate labour.

(7) Previous hæmorrhages which have weakened the patient. Similarly,—

(8) Any weakening disease.

(9) Tumours of the uterus, as myomata.

(10) Placenta prævia, in which part of the placenta is situated below the contractile portion of the uterus.

Treatment.—The most important point, in the successful treatment of post-partum hæmorrhage, is to have a definite plan of action laid out,—a plan which commences with the mildest measures, and goes gradually on to more serious measures if necessary. The following is such a plan, in the order that should be adopted, and presupposing that the failure of each measure in turn requires the adoption of the subsequent one.

(1) Ascertain whether the placenta is in the uterus or in the vagina. If it is in the uterus, stimulate the fundus to contract by gentle friction. If the hæmorrhage still continues, or if the placenta is in the vagina at the beginning.

(2) Endeavour to express it by the Dublin method; if that cannot be done, remove it manually (*v.* page 221).

(3) Stimulate the fundus to contract by friction, and administer ergot. Up to three drachms of the liquid extract (Squibbs) may be given; but more certain and reliable are the hypodermic tabloids of citrate of ergotinin; up to $\frac{1}{25}$ of a grain of this preparation may be administered hypodermically.

(4) Wash the patient externally, and then douche the vagina with creolin solution at a temperature of 110°—120° F., having first passed a catheter.

(5) Douche the uterus thoroughly with the same solution.

(6) Compress the fundus firmly between the fingers of one hand in the anterior fornix, and the other hand upon the abdominal wall, thus squeezing

out any clots that may be retained. Then repeat the intra-uterine douche.

(7) Introduce the hand into the uterus, and remove any fragments of placenta or membranes and all clots that may be in it. Then repeat the intra-uterine douche.

(8) Now choice must be made between two lines of treatment, as the adoption of one excludes the other. These are,—either to plug the uterus with iodoform gauze, or to inject perchloride of iron.

The uterus is plugged with iodoform gauze in the following manner. Seize the anterior lip with a bullet forceps, and pass a posterior speculum if one can be obtained. Then pass a long strip of iodoform gauze up to the fundus, by means of a plugging forceps, or with the end of the Bozeman's catheter. The rest of the strip is then pushed into the uterus, taking care to pass it as far up towards the fundus as possible. If another strip has to be used, it must be knotted to the first strip in order to facilitate its extraction. It must be remembered that it is not the large cavity of a dilated uterus which we have to plug, but only the comparatively small cavity of a contracted uterus; because, on the introduction of a small quantity of gauze, the uterus, which before was flaccid and relaxed, quickly contracts firmly upon the foreign body. A tight abdominal binder is then applied in order to control the uterus from above, and the patient is put back to bed. The gauze is removed in twenty-four hours, and the uterus thoroughly douched out.

The use of perchloride of iron in these cases was introduced by Barnes. He recommends that a few

ounces of the Liq. Ferri Perchlor. (B. P.) be injected into the uterus, from which all clots have been previously removed. An easier method is to add Liq. Ferri Perchlor. fort. (B. P.) to the douche until a light sherry-coloured fluid is produced. The uterus is douched out thoroughly with this, and then with the hot creolin solution. Barnes claims that iron acts in three ways:—

(a) It coagulates the blood in the mouths of the vessels.

(b) It constricts the tissues round the vessels, and thus compresses them.

(c) It provokes some contraction of the muscular wall of the uterus.

The objection to perchloride of iron is that it always causes a certain amount of superficial necrosis of the uterine wall. If saprophytic germs gain access, they have then a suitable nidus in which to lodge. Again, if iron fails to check the hæmorrhage, plugging is impossible, owing to the manner in which the tissues have become constricted. The objection to gauze is that it may not be sterile. If we can be sure that it is sterile, then plugging is much the better line of treatment. If iron is injected, the uterus must be thoroughly douched out the next day.

Compression of the aorta has also been recommended, and is undoubtedly of value if we have an assistant capable of performing it. It is of use while we are adopting local measures for checking the hæmorrhage, as it is at the uterus itself the bleeding must finally be checked.

Concealed hæmorrhage is detected by noticing the

increase in size of the uterus, accompanied if well marked by the usual symptoms of hæmorrhage. To check it the uterus is immediately emptied by expression, and if this does not suffice the treatment proper to external hæmorrhage is carried out.

SECONDARY POST-PARTUM HÆMORRHAGE.

Secondary post-partum hæmorrhage is the term applied to bleeding coming on more than six hours after delivery.

Ætiology.—This condition is due to separation of the thrombi in the uterine vessels, or to a congested condition of the endometrium (Lusk). The former is caused by a sudden increase in the pressure in the vessels, or by sloughing of their walls. The latter is caused by a relaxed condition of the uterus due to the retention of pieces of placenta or membranes, by malposition of the uterus, or by fæcal accumulation. Deciduoma malignum must also be remembered as a cause of very persistent secondary post-partum hæmorrhage.

Treatment.—If the hæmorrhage is slight, free administration of ergot and expression of the clots may be sufficient. If they do not suffice, or if the hæmorrhage was severe from the first, a hot vaginal and uterine douche must be given, and an attempt made to determine the cause of the bleeding. If a retro-deviation of the uterus is present, it must be corrected; if a portion of placenta has been left behind, it must be removed by the fingers or a blunt flushing curette. If the bleeding still continues, the uterus must be plugged with iodoform gauze.

Post-hæmorrhagic Collapse.—When a patient is attacked by any kind of hæmorrhage, there are two chief indications for treatment :—

- (1) The hæmorrhage must be checked.
- (2) The collapse which threatens to follow the hæmorrhage must be staved off.


I have described how hæmorrhage may be checked ; I shall now consider the treatment of the collapse. When a patient loses a quantity of blood, death threatens. This occurs not because there is an insufficient quantity of blood in the body, but because the blood-vessels have not had time to contract to suit their capacity to the diminished quantity of blood. Blood consequently does not return to the heart in sufficient quantities ; the latter has not sufficient fluid to contract upon ; as a result, its contractions become more and more feeble, and an insufficiency of blood is sent to the brain. In consequence of this, feeble stimuli are transmitted to the heart, which fails still more, a vicious circle being thus established. Reasoning from this, we see that it is necessary to turn our treatment in three directions :—

- (1) The heart must be stimulated.
- (2) The diminished quantity of blood must be limited, as far as possible, to the important organs of the body, *i. e.* the brain and the viscera.
- (3) The amount of fluid in the blood-vessels must be increased.

We can stimulate the patient by giving alcohol by the mouth ; by the hypodermic injection of ether, strychnine, or brandy ; and, by the use of hot fomentations over the heart. We can keep the

blood in the important organs, first, by placing blocks beneath the foot of the bed, and thus making the patient's head the most dependent part of her body; subsequently, by bandaging tightly the arms and legs, and thus preventing blood from being wasted upon them. We can increase the quantity of fluid in the blood-vessels by giving plenty of fluid by the mouth; by administering enemata of salt and water; and by infusing saline solution directly into a vein, or into the connective tissues of the breast, axilla, or buttock.

There are no special points in the above treatment which call for description, except the method of infusing saline solution into a vein. The apparatus required for this purpose is very simple. It consists of:—a small metal funnel which holds about three ounces; a rubber tube of about three feet in length; and a small silver cannula (*v.* Fig. 25). The solution used is made by adding a teaspoonful of salt to a pint of water. If possible it must be sterilised by boiling, and must be used at a temperature of 100° F. The operation itself is as follows:—Tie a bandage round the upper arm sufficiently tightly to compress the veins, but not the arteries. By this means the veins are made to stand out, and a suitable one can be selected. Expose the latter by means of an incision about an inch long made over it; isolate a very small portion, and then slip two ligatures beneath it. The distal ligature is tied to prevent hæmorrhage; the vein is opened by a longitudinal incision sufficiently long to admit the cannula; and the latter is introduced. Next tie with a single turn the proximal ligature, in such a



manner that the vein is compressed against the cannula, in order to prevent the escape of the solution ; and remove the bandage which was compressing the arm (*v.* Fig. 25). Before the cannula is introduced the entire apparatus must be filled with the saline solution, the escape of it being controlled by pressure upon the tube. The fluid is now

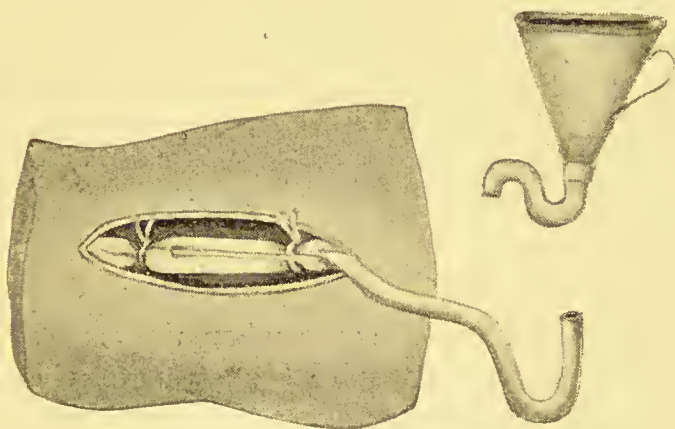


FIG. 25.—Apparatus, and method of inserting cannula, for intra-venous infusion of saline solution (diagrammatic).

allowed to flow, an assistant taking care that the funnel is always filled with solution. As many as five, six, or even more pints may be injected in severe cases. When sufficient has been injected the cannula is removed, the second ligature tied tightly, the vein cut across, and the skin wound stitched up with a continuous suture.

Let me conclude this chapter with a well-known remark : “Your patient should not be allowed to die of post-partum hæmorrhage.”

CHAPTER XIX.

PRECIPITATE LABOUR—UTERINE INERTIA—RETAINED PLACENTA.

Precipitate Labour: Treatment—Uterine Inertia: Varieties—
Primary Uterine Inertia: Ætiology, Symptoms, Treatment—
Secondary Uterine Inertia: Ætiology, Symptoms, Treatment
—Retained Placenta: Ætiology, Treatment.

PRECIPITATE LABOUR.

PRECIPITATE labour occurs when the contractions of the uterus are considerably stronger than are necessary in order to overcome the resistance of the soft parts of the mother. As a result, the child is driven rapidly through the pelvis, and is born when, perhaps, the mother is not in a suitable position. In consequence of this, the umbilical cord may be torn, the placenta may be detached prematurely, the uterus may be inverted, or the death of the child may result. Perinæal laceration may also occur.

Treatment.—If we know that a patient is subject to precipitate labour, she should be placed in bed immediately labour commences, and should not be allowed to leave it. She should refrain from bearing down, and with this object it is usually well to administer chloroform. By this means accidents will be prevented.

UTERINE INERTIA.

By uterine inertia, we mean that the contractions of the uterus are feeble, so that they either fail to expel the child, or only succeed after a long time.

Varieties.—Uterine inertia occurs in two distinct forms :—(1) primary inertia ; (2) secondary inertia. These are so distinct one from the other that they must be considered separately.

Primary Uterine Inertia.—In this condition the contractions of the uterus are more feeble than normal, from the very commencement of labour. The uterus never contracts strongly.

Ætiology.—The causes of primary uterine inertia usually lie in the uterus itself, or in its contents. They are :—

- (1) Weak muscular development.
- (2) Faulty shape, as uterus bicornis.
- (3) Metritis.
- (4) Over-distension, as by hydramnios or twins.
- (5) Tumours, as myomata.
- (6) Generally contracted pelvis.
- (7) Frequent labours.

More rarely uterine inertia is due to wasting diseases, mal-nutrition, and such like conditions, which imply that the mother is in a very debilitated state.

Symptoms.—The os dilates slowly ; there is only slight distension of the bag of membranes during a pain ; no caput succedaneum forms upon the child's head ; and the hardening of the uterus during a pain is almost imperceptible. If the head lies in the pelvis for a very long time, the patient becomes feverish

and restless, and sloughing of the vaginal walls or cervix may occur in rare cases. The third stage is usually characterised by the slow expulsion of the placenta, or by its non-expulsion, and probably by the occurrence of atonic post-partum hæmorrhage.

Treatment.—In primary uterine inertia the uterus is obviously not sufficiently strong to expel the child, and the indication is to stimulate and assist it. This may be done by massage of its walls, stimulating food, hot vaginal douches, followed by the expression of the fœtus if possible (Kristeller's method). If such treatment is not successful, forceps must be applied as soon as the necessary conditions are fulfilled (*v.* page 301). In such cases we should be prepared for the occurrence of post-partum hæmorrhage, and have everything ready for its treatment.

Secondary Uterine Inertia.—In this condition the contractions of the uterus may have been of normal intensity or even too strong at the commencement of labour, but have gradually diminished in strength as labour proceeds.

Ætiology.—A lesser degree of the same pathological conditions of the uterus that caused primary inertia, may also cause secondary inertia. To them may be added the following :—

- (1) Distension of the bladder or rectum.
- (2) Large head.
- (3) Pendulous abdomen.
- (4) Weakness or collapse of the patient.
- (5) Rigid soft parts.
- (6) Any form of contracted pelvis.

Symptoms.—The patient will have been for some

time in normal, or perhaps in excessively strong labour, then the contractions gradually become more feeble, and if the condition persists the train of symptoms as given under primary inertia supervenes.

Treatment.—If any obstruction, such as a full bladder or rectum is present, remove it. Correct any obliquity of the uterus by applying an abdominal binder. Give the patient an opiate, as—Tinct. Opii 20 to 30 minims; this will cause her to sleep, and when she awakes, she will be refreshed, and the pains may return. If she still fails to deliver herself, forceps may be applied.

RETAINED PLACENTA.

I have already said that if the uterus fails to expel the placenta, it must be made to do so. It may expel the placenta immediately after the birth of the child, or it may not expel it for an hour. If the uterus has not expelled the placenta spontaneously within this period, steps must be taken to expel it artificially.

Ætiology.—There are four chief causes of retained placenta :—

- (1) Uterine inertia.
- (2) Morbid adhesions between the placenta and the uterus.
- (3) A *placenta membranacea*.
- (4) Hour-glass contraction of the uterus.

(1) In uterine inertia the placenta is retained in the uterus, owing to the failure of the force which normally expels it.

(2) Morbid adhesions between the placenta and the uterus are the result of endometritis; they may be so dense that it is almost impossible to remove the placenta.

(3) A *placenta membranacea* is the term applied to a large, thin, membranous-like placenta. When the uterus contracts, it crumples up such a placenta in its interior instead of detaching it.

(4) Hour-glass contraction is a very rare condition. The uterus contracts circularly below the placenta, while the fundus remains uncontracted. It is practically always due to bad management of the third stage. The attendant massages the lower uterine segment instead of the fundus, so causing the former to contract and prevent the expulsion of the placenta.

Treatment.—If the retention is due to hour-glass contraction, cease massaging the uterus; the contraction will then probably pass off, and the placenta will be expelled. If it is not expelled, and if expression fails, or if there is hæmorrhage and we cannot wait, introduce the fingers into the uterus in the shape of a cone, push them gently and slowly through the obstruction, and remove the placenta. Care must be taken to do this slowly and without force, or the uterus may be ruptured.

In retention of the placenta, due to other causes, massage the fundus, and attempt to express the placenta by the Dublin method (*v.* page 90). If this fails it must be removed manually. This operation, which used to be considered one of the most dangerous in midwifery, owing to the risk of sepsis, is now performed with comparative safety if strict

aseptic precautions are used. It is performed as follows :—Place the patient in the cross-bed position, wash her thoroughly externally, and empty the bladder. Introduce the hand into the uterus, taking care to keep outside the membranes, and applying counter-pressure with the other hand upon the fundus. Feel for the edge of the placenta, and with the tips of the fingers separate it from the uterus with a sawing motion. Endeavour to detach it all in one piece. When it is completely detached, seize it in the hand passed above it, and remove it. Introduce the hand again into the uterus to ascertain if any portions have been left behind. As soon as all the fragments have been removed douche the uterus thoroughly, and put the patient back to bed. Never give an anæsthetic in these cases if it can be avoided, as it may interfere with the subsequent contractions of the uterus. If it must be given, let the patient be fully under its influence before the hand is introduced into the uterus, as this latter proceeding sometimes causes a considerable amount of shock to the patient; and, when this shock occurs at a time when the patient is commencing to go under the influence of an anæsthetic, the tendency to cardiac syncope is very great.

CHAPTER XX.

ECLAMPSIA.

Definition—Morbid Anatomy—Ætiology: Predisposing Conditions—Symptoms: Prodromal, Actual—Complications—Treatment: Prophylactic, Curative, Chloroform Treatment, Morphia Treatment, Position of Patient, Feeding, Induction of Labour, Venesection—Prognosis.

ECLAMPSIA is the term applied to recurrent convulsive attacks occurring in pregnant or puerperal women, which are the manifestations of an intoxication arising as an indirect result of the pregnancy.

Morbid Anatomy.—If a post-mortem examination is made on a woman who has died of eclampsia, a series of more or less constant morbid conditions is met with. Nothing, however, has been found which can be regarded in the light of a primary lesion.

Liver.—The colour is more yellow than usual, due to commencing fatty degeneration or varying lesions of the epithelium (Pilliet). Small hæmorrhages are met with both beneath the capsule and into the liver substance, and also areas of necrosis round the portal spaces, from which emboli—of fat (Virchow)—of liver cells (Jürgens) may be carried to other organs.

Kidneys.—The commonest condition found is

that known as the pregnancy kidney (Leyden) (v. page 142). Chronic nephritis is more rarely present. Distributed around some of the convoluted tubes there are found minute areas of necrosis resembling those found in the liver.

Spleen.—The spleen is enlarged, congested, and soft. Areas of necrosis, as in the liver, are met with, and small hæmorrhages beneath the capsule and into the spleen substance (Bouffe de Saint-Blaise).

Brain.—It is sometimes hyperæmic, sometimes anæmic, somewhat œdematous, with consequent flattening of the convolutions, and showing minute hæmorrhages in various parts.

Lungs.—They are usually œdematous, especially at their bases; subpleural ecchymoses are seen, and emboli are found which may come from the liver.

Ætiology.—We have very little positive knowledge of the causation of eclampsia. Some of the theories require special mention:—

(1) *Frerichs.*—That eclampsia is uræmic in origin, *i. e.* is due to the retention of urea in the blood. In opposition to this theory is the fact, that in the case of patients who die from eclampsia, no storage of urea can be found in the liver or muscles. Again, in the case of those who recover, no increased amount of urea is excreted in the urine. Furthermore, urea has been injected into the blood without causing convulsions, and has even been said to have a diuretic effect (Bouchard).

(2) *Traube-Munk-Rosenstein.*—That eclampsia is primarily caused by the hydræmia of the blood

which occurs during pregnancy ; the secondary cause being furnished by the contractions of the uterus, which, by raising the blood-pressure, cause œdema of the brain, it in turn causing anæmia. In opposition to this is the fact, that hydræmia is not particularly well marked in eclamptic patients. Also fits occur before the onset of labour, *i. e.* before the blood-pressure is raised (Winckel). In opposition to this last statement may be urged the fact, that perceptible painless contractions of the uterus occur in the later months of pregnancy. If these contractions are strong enough to cause a very perceptible hardening of the uterus, they must also be sufficiently strong to raise the blood-pressure.

(3) *Stumph.*—That the fits are due to the circulation, in the blood, of some poison produced by an abnormal decomposition in either mother or child. This poison Stumph says may be acetone,—a substance which he has almost always detected in the urine of eclamptic patients. That this poison, in its passage through the kidneys, causes nephritis ; through the liver, a destruction of the pareuchyma of that organ ; through the brain, convulsions and coma.

(4) The theory most generally accepted at present is, that the fits are due to the retention of the normal urinary toxins owing to a failure of function on the part of the kidney, *i. e.* a urinæmia. Coincidentally with the onset of the premonitory symptoms of eclampsia the urine has been noticed to contain a diminished quantity of these substances ; the total amount of urine passed is also considerably diminished. Coincidentally with the recovery of the

patient the quantity of toxic substances in the urine is considerably increased, as is the total amount of urine passed. It is of no great importance to know what the exact nature of these toxins is; it is sufficient if we are sure that they are the *normal* urinary toxins.

(5) *Bouchard*. — So-called “auto-intoxication,” due to failure of function not only of the kidneys but of the liver, as a cause of eclampsia has also received much attention of late. It differs from the foregoing only in the inclusion of the liver as an element both in the production and the non-elimination of toxins.

(6) *The neurotic theory*.—That eclampsia is due to heightened irritability of the nerve centre, or to excessively strong stimuli from the uterus (*eclampsia reflectorica*). This theory serves to explain those cases (about 5 per cent.) in which the kidneys are healthy.

Apart from theories, there are certain conditions which are known to predispose to eclampsia. These are :—

- (1) Acute and chronic diseases of the kidneys, particularly “pregnancy kidney” (*v.* page 142).
- (2) Obstructed delivery.
- (3) Old and very young primiparæ,—*i. e.* rigid uterine muscle fibres, and so more painful labour pains.
- (4) Long retention of the excretions.
- (5) Multiple pregnancy.

Taking into consideration the great number of different theories that are brought forward with

regard to the ætiology of eclampsia, the majority of which are supported by apparent facts, we are forced to the conclusion that we should look not for one specific cause, but for several causes which acting either singly or together will be sufficient to determine the onset of fits. And so we find that we have two widely differing sets of causes, either of which may arise in two ways :—

I. The poisoning of the nerve centres by toxic substances circulating in the blood owing to—

- (1) The accumulation of normal toxins from failure of the renal function, owing to pre-existing renal disease.
- (2) The excessive formation of normal toxins, or the formation of abnormal toxins, which during their process of excretion through the kidneys cause nephritis, and hence suppression of urine, and hence a further increased amount of toxins in the blood.

II. The over-activity of the nerve-centres due to—

- (1) Their over-excitability to normal stimuli, as in the case of hysterical people or epileptics.
- (2) Their over-irritation by excessive stimuli, as in the case of obstructed labour, very painful labour pains, very old and very young primiparæ.

Symptoms.—The symptoms must be considered under two heads :—

- (1) Prodromal.
 - (2) Actual.
- (1) *The prodromal symptoms* come on a short

time before the onset of the fits in the large majority of cases, and are of great importance. The timely recognition and treatment of them may stave off the threatened attack. They are:—complete or partial, temporary or persistent, loss of vision; flashes of light before the eyes; vertigo; headache; drowsiness; mental depression; nausea; and epigastric pain. At the same time the amount of urine excreted becomes very considerably diminished; and, if a specimen can be obtained for examination, it is found to contain a very large quantity of albumen, and numerous granular and fatty tube casts.

(2) *The actual symptoms* commence with the onset of the fits. A fit lasts from one to one and a half minutes, and consists of three stages, a preliminary stage, a tonic stage, and a clonic stage,—followed by a varying period of coma. In the preliminary stage, the eyelids twitch vigorously and spasms of the muscles of respiration occur. Then the tonic stage supervenes, and the patient lies with all her muscles contracted. She becomes deeply cyanosed, and froth appears at the mouth. The clonic stage follows; she “works” vigorously for a time, then respiration gradually returns, and the patient lies in a condition of deep coma. The duration of coma varies according to the number of fits that have occurred. At first it may only last a few minutes; but, as the number of fits increases, she lies in a continuous condition of coma during the intervals between them. The number of fits varies from one or two up to any number. They may pass off entirely for a time, and then recur. In a severe case the fits follow one

another at ever-shortening intervals; the heart becomes weaker; and the lungs œdematous, at first at the bases, and then universally. The pulse is frequent; the temperature, which was normal at first, rises as the case progresses, perhaps attaining a height of 104° F.; total or partial loss of vision or of memory may persist for a considerable period after the fits have ceased.

Complications.—The principal complications to be feared are failure of the heart, and œdema of the lungs. They occur in almost all fatal cases, and are the direct cause of death. Hæmorrhage into the brain may occur during a fit, or may happen even after the fits have entirely ceased. In a case which the author attended the patient died of cerebral hæmorrhage, which apparently took place thirty-six hours after the last fit.

Treatment.—The treatment of eclampsia must be considered under two heads:—

I. Prophylactic.

II. Curative.

I. *Prophylactic treatment* should be adopted in the case of every patient who has persistent albuminuria, especially if there are tube-casts in the urine. When a patient suffering from albuminuria has been on milk diet for a week, she almost to a certainty escapes eclampsia (Tarnier). Eclampsia occurs almost exclusively in women whose urine has not been examined during pregnancy (Ribemont-Dessaignes). Accordingly the patient should be placed on milk diet, and limited to it as far as possible. Her bowels should be kept free by the daily administration of a purgative such as the Pil.

Colocynth. et Hyoscyami (B. P.). The amount of urine she passes must be most carefully watched, in order that any marked diminution may be immediately detected. If this occurs, a hydragogue purgative must be at once administered; followed, if the diminution in the urine is considerable, by a wet pack and hot baths. The patient is also wrapped in blankets in order to favour sweating. A suitable purgative to administer in these cases consists of Calomel 10 grains, combined with Pulv. Jalapæ Co. 1 drachm, and followed in six hours by an enema if necessary. If in spite of all precautions an eclamptic fit occurs, our treatment must then become curative.

II. *The curative treatment* of eclampsia must be chiefly directed towards two points:—

- (1) The arrest of the fits.
- (2) The staving off of complications.

(1) The fits must be checked at the earliest possible moment, as each successive fit leaves the patient more comatose, and more likely to fall a victim to the complications of a failing heart and œdema of the lungs. Two different lines of treatment are recommended:—

(a) The first of these is the chloral and chloroform treatment. This consists in administering, upon the onset of the attack, thirty grains of chloral hydrate by the rectum; and repeating it every two hours until the fits cease, but not more than three and a half drachms should be given in the twenty-four hours. The inhalation of chloroform is commenced as soon as any sign of the onset of a fit occurs, and continued until the fit ceases.

(b) The second line of treatment consists in the administration of large doses of morphia, hypodermically, as recommended by G. Veit. It is considerably the better method of treatment, and is carried out as follows:—Half a grain of morphia is administered hypodermically upon the onset of the first fit, and is followed every two hours by a quarter of a grain, until the fits cease. Not more than three grains should be given in the twenty-four hours.

Either of these lines of treatment will check the fits; but both chloral and chloroform depress the heart seriously, and consequently favour that most dreaded complication—heart failure. On this account the morphia treatment is to be preferred. In addition to either of these treatments the patient must be freely purged. If the patient is conscious, calomel and compound jalap powder, as recommended above, are the best purgatives; if, however, she is comatose, it is useless to place any bulky medicine in her mouth, as it would not be swallowed. Two minims of croton oil, made into a small bolus with a little butter, and placed as far back upon the tongue as possible, may reach the stomach. A soap and water enema should also be given if necessary. Every effort should be made to encourage free sweating. The patient must be kept in blankets, and hot baths administered if possible; if the latter are not possible, a wet pack may be tried instead, or hot-air baths. The amount of urine excreted must also be increased as far as possible; hot stupes over the kidneys, and abundance of fluid by the mouth if the patient is conscious, will sometimes be of avail.

(2) Complications will be staved off most of all by

intelligent nursing, and by paying the greatest attention to details. Whilst the patient is in the fit, she must be prevented from injuring herself. She is especially likely to bite her tongue, when it is extruded during the fit. This is prevented by the use of a gag. A very serviceable one may be made in a moment by wrapping a towel or other piece of cloth round a spoon. All feeding by the mouth must be stopped, as, if the patient is comatose, nourishment placed in the mouth is more likely to find its way into the lungs than into the stomach. If it is required to give nourishment while she is in this condition, nutrient enemata must be administered. The position of the patient must be such that the saliva, which tends to collect in the mouth, will trickle out at the side of it, instead of running down into the trachea, *i. e.* she must lie upon her side, and not upon her back. If the heart becomes weak and rapid, digitalin and strychnine may be administered hypodermically.

There are two or three points in the treatment of eclampsia which are still matters of dispute. The first of these is the question as to the advisability of the induction of premature labour and of immediate delivery. It is of course a fact, that, if the patient were not pregnant, the eclamptic fits would not occur. Hence the supporters of immediate delivery reason, that, if pregnancy is brought to an end, the fits will cease. There are two objections to this line of reasoning. First, that the effects of pregnancy on the maternal organism do not disappear the moment the child has passed the vulva. Secondly, that uterine contractions directly excite the convulsive

attacks, in the same way that any other violent movement or emotion will excite them. If the fits can be checked before labour comes on, the prognosis of the case will be improved. If labour comes on before the fits are checked, the shorter the duration of labour the better the prognosis of the case. Following this reasoning, it seems best not to induce labour unless all other means of checking the fits have failed, but if labour comes on spontaneously, to shorten its duration as much as possible, without employing such violence as would cancel the good effects obtained by the lessened period of uterine contraction. In other words,—apply the forceps and deliver the child as soon as the necessary conditions for its application are present; do not adopt such violent measures as Cæsarean section or *accouchement forcé*. Any operation, which has to be performed, must be performed while the patient is deeply under an anæsthetic, as by so doing, the shock of the operation is lessened.

The advisability of venesection is another unsettled point. The toxicity of the blood in eclampsia has been proved by Chambrelent; and it is thought by some that if the patient is freely bled, a certain amount of the toxic agent will be removed. On the other hand; free venesection may dangerously lessen the patient's strength. It may be a useful line of treatment in the case of a strong plethoric patient with symptoms of over-distension of the right side of the heart.

Prognosis.—The prognosis for the life of the infant in eclampsia is always very grave. For the mother the prognosis varies according to the time at

which the fits commence. It is worst when the onset of the fits occurs during pregnancy or labour ; it is best when they start during the puerperium. The greater the number of fits, the worse is the prognosis. A patient has recovered after eighteen fits (Winckel), another after the enormous number of eighty-one (Rosenstein), but such cases are very rare ; as a rule ten fits constitute a very serious case (Dührssen). If the child dies, the maternal prognosis is improved. The amount of urine passed, and the quantity of albumen in it, the temperature, and the condition of the heart and lungs are also important guides.

CHAPTER XXI.

CONTRACTED PELVIS.

Diameters of the Normal Pelvis—Varieties of Contracted Pelvis—Ætiology—Diagnosis—Pelvimetry, Skutsch's Pelvimeter—Symptoms—Mechanism of Pelvis Justo-minor—Mechanism of Flat Pelvis—Mechanism of Generally Contracted Flat Pelvis—Treatment—Table of Degrees of Contraction—Walcher's Position—Time at which to induce Premature Labour—Müller's Method.

THE pelvis is said to be contracted if any of its diameters are smaller than the normal. The normal diameters of the brim of the pelvis measure :—

| | | | |
|-----------------------|---|---|---------------------------------------|
| Conjugata vera | . | . | 4—4 $\frac{1}{4}$ inches (10—11 cm.). |
| Oblique diameters (2) | . | . | 5 „ (12·5 „). |
| Transverse | . | . | 5 $\frac{1}{4}$ „ (13·5 „). |

Varieties.—The following classification of the different varieties of contracted pelvis is that adopted by Litzmann :—

I. Contracted pelvis without change of shape—

- (1) Generally contracted pelvis.
- (2) Dwarf pelvis.

II. Contracted pelvis with change of shape—

- (1) Flattened pelvis.
 - (a) Simple flat.
 - (b) Rachitic flat.
 - (c) Generally contracted flat.

- (2) Obliquely distorted pelvis.
 - (a) By spinal curvature—kypho-scoliosis.
 - (b) By imperfect or abolished use of one lower limb—coxalgic.
 - (c) By asymmetry of sacrum—synostotic (Naegele's pelvis).
- (3) Transversely contracted pelvis (Roberts' pelvis).
- (4) Funnel-shaped and lumbo-sacral kyphotic.
- (5) Compressed pelvis.
 - (a) Rachitic.
 - (b) Osteomalacic.
- (6) Spondylolisthetic pelvis.
- (7) Pelvis narrowed by tumours, exostoses, fractures.
- (8) Fissured pelvis.

The varieties of contracted pelvis most commonly met with in these countries are :—

I. Generally contracted (pelvis æqualiliter justo-minor) and dwarf pelvis very closely resemble one another. The former is met with occasionally in small women, also more rarely in normally sized or even large women. The latter is met with in dwarfs and very small women. The bones are small and delicate, resembling those of a child's pelvis. In these varieties all the pelvic diameters are diminished, but still preserve their relative proportions.

II. (1) *Flattened pelvis*.—These are the most common forms of contracted pelvis met with. The principal feature is the shortening of the antero-posterior diameter of the brim, while the other diameters remain normal, or are slightly affected. It may be subdivided into :—

- (a) Simple flat.
- (b) Rachitic flat.
- (c) Generally contracted flat.

(a) The simple flat pelvis occurs in patients who have no traces of rickets. It has been attributed to the carrying of heavy weights in early life, and also may be the result of a congenital condition. The antero-posterior diameter of the brim is shortened, and at all levels the oblique and transverse diameters are considerably longer than in the normal pelvis, in comparison to the conjugate (Winckel). The sacrum

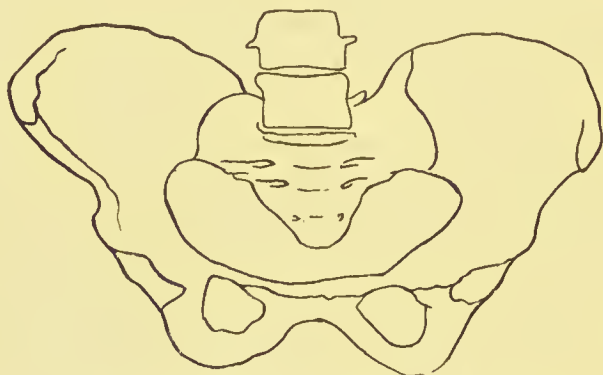


FIG. 26.—Rachitic flat pelvis. (E. Martin.)

is usually narrow, and pushed downwards between the iliac bones without any marked rotation on its transverse axis (Winckel). The line joining the promontory with the tip of the coccyx makes, with the plane drawn through the latter point, a more obtuse angle than in the case of the rachitic flat pelvis (Ribemont-Dessaignes).

(b) The rachitic flat pelvis is generally attributed to rickets occurring in infant life. The conjugate diameter exhibits a greater or less degree of

shortening. The transverse diameter is sometimes increased in length owing to outward rotation of the iliac bones, but as a rule this increase is counter-balanced by the undeveloped condition of the pelvis as a whole. The sacrum is pushed downwards and forwards, its vertebral bodies are more displaced than its wings, so that its anterior surface is flat or even convex; as a result of this downward and forward displacement of the sacrum the weight



FIG. 27.—Scolio-rachitic pelvis. (E. Martin.)

of the body is transmitted to the latter, in such a manner as to cause a rotation of the bone on a transverse axis, and so a still further tilting forwards and downwards. As a further result of this displacement, strong traction is exercised, through the sacro-iliac ligaments, on the posterior portions of the iliac bones, so tending to make these portions approximate, while the anterior portions are separated. Thus it comes about that the distance between the anterior superior iliac spines becomes either equal to, or greater than the distance between the crests,

and the pubic arch is considerably widened. A double promontory is sometimes found at the junction of the first and second pieces of the sacrum, due to the displacement of the vertebral bodies (Fig. 26).

(c) Generally contracted flat pelvis may occur with or without a history of early rickets, the former is

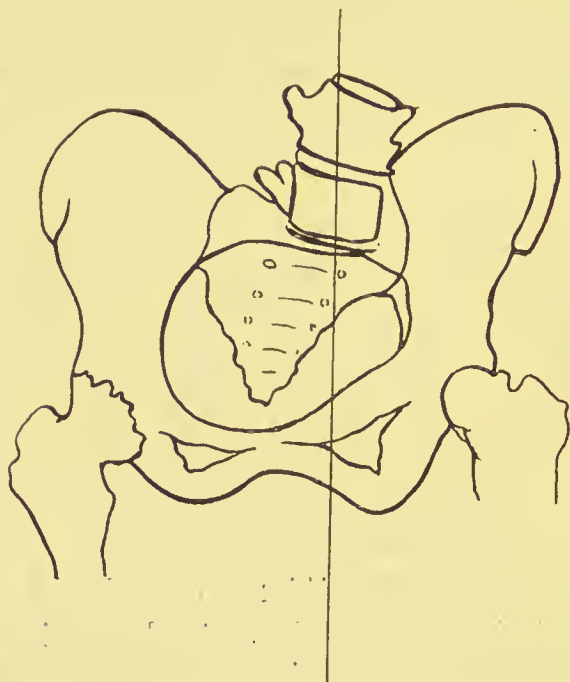


FIG. 28.—Obliquely distorted pelvis owing to right-sided coxalgia. (Ribemont-Dessaignes).

very much the more common. Its principal characteristic is a narrowing of all the diameters, as in generally contracted pelvis; with the addition of a disproportionate diminution in the conjugate. In the rickety form there is marked deformity of the bones, especially of the rami of the pubes (Winckel), as well as evidence of interference with their

growth. Owing to the flattening in of the lateral portions of the pelvis by pressure transmitted through the heads of the femora, the pelvic ring becomes somewhat pointed anteriorly. In the non-rachitic form, described by Litzmann, there is no marked deformity of the bones. The promontory is raised instead of being very low as in the rachitic

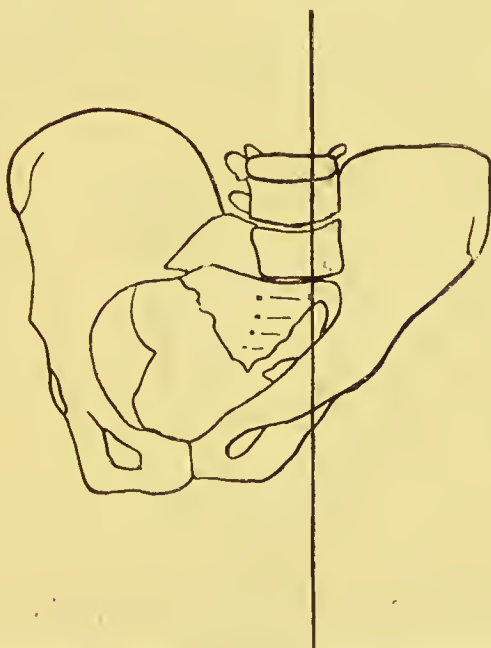


FIG. 29.—Obliquely distorted pelvis owing to synostosis of left sacro-iliac joint. Naegele's pelvis. (Ribemont-Dessaignes.)

form, and only projects a little. The diminution of diameters involves the entire pelvic cavity, and is not confined to the brim.

The other forms of contracted pelvis are very rarely met with in these countries. The following brief note may give a slight idea of their chief characteristics.

II. (2) Oblique distortion of the pelvis consists in the deviation of a part or the whole of the pelvis, towards one or other side, in such a manner that a marked difference results in the respective lengths of the oblique diameters. This distortion may be due to:—

(a) Spinal curvature. To cause marked interference with the shape of the pelvis the curvature

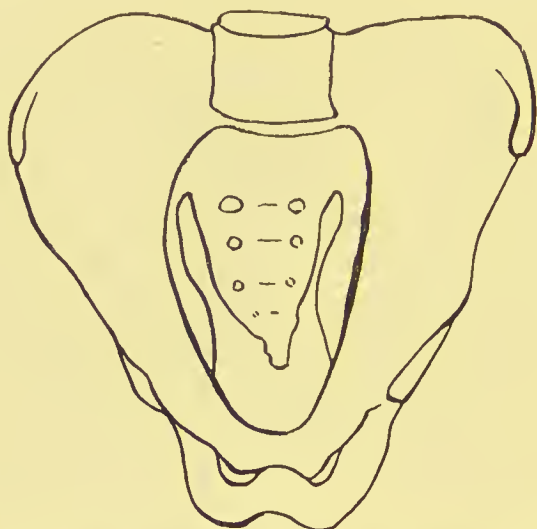


FIG. 30.—Roberts' transversely contracted pelvis. (Ribemont-Dessaignes.)

must be situated low down in the vertebral column. The commonest condition associated with this form of pelvis is rachitic scoliosis, involving the lumbar region. The sacrum deviates, and the pelvis is also distorted to the opposite side from that to which the lumbar vertebræ are deflected. The oblique diameter on the same side as the spinal deflection is longer than its fellow (Fig. 27).

(b) To unilateral coxalgia, to amputation or old

distortion of one lower limb, or to comminuted fracture of one ilium. The healthy side of the pelvis is narrowed and flattened, the diseased side dilated and hollowed out. This oblique narrowing may extend to the outlet (Winckel). The pelvis is distorted towards the affected side, and the oblique diameter of the opposite side to the lesion is the longer (Fig. 28).

(c) To asymmetry of sacrum,—Naegele's pelvis. This condition may be caused by unilateral disease,

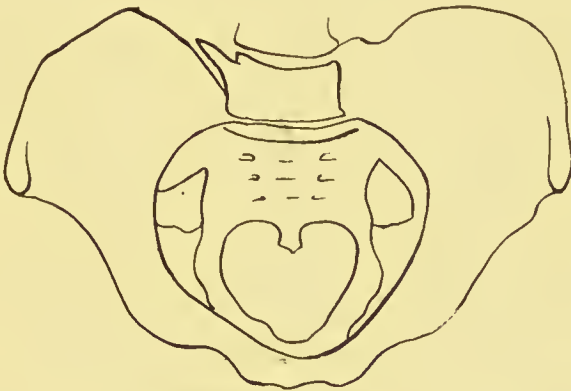


FIG. 31.—Funnel-shaped pelvis. (Winckel.)

fracture, or failure of development, in the region of either sacro-iliae joint. The pelvis is distorted towards the healthy side. The oblique diameter of the same side as the lesion is the longer (Fig. 29).

(3) Transversely contracted pelvis, or Roberts's pelvis, consists in symmetrical narrowing of the pelvis with compensatory antero-posterior elongation. The condition is caused by synostosis of both sacro-iliae joints, with practical absence of the sacral alae (Fig. 30).

(4) Funnel-shaped and lumbo-sacral kyphotic

pelvis is caused by the displacement backwards of the sacrum owing to the lordosis. This in turn causes a slight increase in the true conjugate, and a diminution in the transverse diameters, especially marked at the outlet (Fig. 31).

(5) The compressed or triradiate pelvis arises as the result of two conditions:—

(a) Rickets.

(b) Osteomalacia.

(a) The rickety, or pseudo-osteomalacic pelvis, is

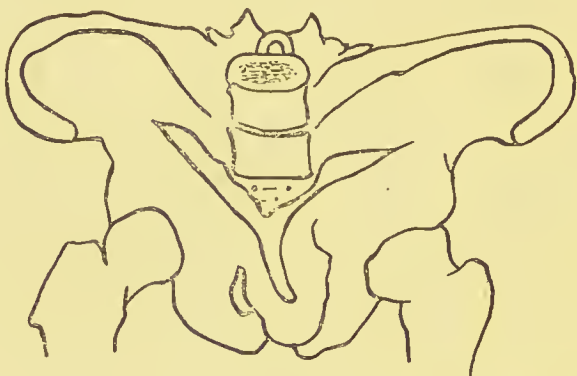


FIG. 32.—Osteo-malacic pelvis. (Ribemont-Dessaignes.)

the result of an advanced type of rickets occurring or persisting at a time when the child was walking about, and in which the pelvic bones only were diseased. In the ordinary rachitic flat or generally contracted flat pelvis we meet with the result of early rickets, in which the child was unable to walk. In it a main cause of the contraction is the pressure transmitted through the vertebral column on to the sacrum, or to a very slight degree through the femora on to the pelvic ring. In the triradiate pelvis the pressure is transmitted equally through

the vertebral column and the femora, in a case of advanced rickets. As a result both the sacrum and the acetabular region are equally driven in, and the worst form of rickety contraction arises.

(b) The changes that result from osteomalacia closely resemble the preceding condition. Osteomalacia consists in an ostitis and periostitis, in which the hard bones are decalcified and replaced first by lamellar connective tissue; finally this passes centrally into the round granular medullary cell. The medullary spaces and Haversian canals grow large, the bone corpuscles in part disappear, in part become shorter and their process smaller (Winckel). As a result of this change the bones become of an extremely soft consistency, and hence another name for the condition—*Mollities ossium*. In the pelvis this change results in the driving downwards and forwards on the promontory, while at the same time the sacrum is doubled on itself, so that the tip of the coccyx approaches the promontory; the cotyloid cavities are driven inwards, approaching one another and the promontory; the alæ ilii are thickened and folded upon themselves in such a manner as to form a groove running from above downwards. It is a disease practically never met with in these countries (Fig. 32).

(6) The spondylolisthetic pelvis (σπόνδυλος, a vertebra, and ὀλίσθησις, a slipping) is due to the displacement of the fifth lumbar vertebra forwards and downwards, so that its inferior surface is in contact with the anterior surface of the first sacral vertebra, to which it becomes synostosed. At the same time the arch of the lumbar vertebra remains

in its old position, held by its inferior processes. The condition is due to the slipping forwards of the lumbar vertebra when the bony parts are still soft enough to permit of a stretching of the lateral interarticular processes, to inflammatory conditions, and to direct injury (Fig. 33).

(7) The pelvis may be narrowed by tumours—osteomata, enchondromata, fibromata, sarcomata, car-



FIG. 33.—Spondylolisthetic pelvis. (E. Martin.)

cinomata ; by exostoses the result of inflammatory changes ; and by fractures, especially when associated with dislocation.

(8) A fissured pelvis is the result of the non-union of the pelvic bones at the symphysis. It is usually associated with *ectopia vesicæ*.

Diagnosis.—The diagnosis of contracted pelvis is made,—from the appearance of the patient, from the history of the patient, from the symptoms of the patient during pregnancy and labour ; and is confirmed by measuring the pelvis.

The appearance of the patient suggests contracted pelvis if any of the following conditions are present :—

- (1) Kyphosis or scoliosis, particularly when it occurs in the lumbar region.
- (2) Marked lordosis (anterior lumbar curvature).
- (3) Crooked legs, or legs of unequal length.
- (4) Enlargements of the junction of the cartilage and rib.
- (5) Pendulous abdomen.
- (6) Diminutive stature.

The history of the patient should be inquired into:—

(1) As regards her childhood ; to ascertain if there is any evidence of early rickets, as,—late dentition, inability to walk at the proper age, a temporary loss of the power of walking.

(2) As regards her previous labours ; to ascertain whether they have been difficult or easy, whether the children were born dead or alive.

The symptoms of the patient during pregnancy and labour are of great importance. A contracted pelvis may commence to cause trouble in the early months of pregnancy ; the fundus of a retroflexed uterus may become incarcerated beneath the overhanging promontory (*v.* page 151). In the later months the growing uterus is pushed up out of the pelvis by the narrow brim ; and, as a result of the lack of support which it thus experiences, the fundus falls forward against the abdominal walls. A pendulous abdomen is thus produced. Also malpositions of the child are common, as I have explained before (*v.* page 45). When the patient comes into

labour the head is found to be free above the brim at a time at which it ought to be fixed (*v.* page 33). Labour is very tedious, due to one or to all of the following reasons :—

(1) The narrow brim prevents the head from descending.

(2) A malpresentation may be present.

(3) The anteversion of the uterus prevents the due amount of help being obtained from the abdominal muscles.

(4) As a result of the head not filling the lower uterine segment the membranes rupture prematurely, and the liquor amnii drains away early in the first stage (*v.* page 101). The dilating action of the bag of membranes is thus lost, and the head itself is obliged to dilate the os. This it accomplishes slowly if it comes through the brim. If it does not come through, the os never completely dilates.

The uterine contractions are at first strong. If they continue so and do not succeed in delivering the child, the uterus will rupture. On the other hand, in many cases secondary uterine inertia sets in, owing to the obstructed delivery.

If the result of our examination suggests the possibility of contracted pelvis, then the pelvic diameters must be measured.

Pelvimetry may be external or internal. A little information can be got from the former, especially in the greater degrees of contraction, and in irregularly contracted pelvis ; the most valuable information from the latter in all cases. There are three points of some slight value which can be ascertained by external pelvimetry :—

(1) The length of the external conjugate, *i. e.* the distance between the upper margin of the symphysis externally, and the depression under the spinous process of the last lumbar vertebra. It is normally about 8 inches (20 cm.) in length. If in any case it is found to be less than $6\frac{1}{4}$ inches (16 cm.) there is certainly some degree of contraction present.

(2) The normal distance between the anterior superior spines of the ilia is $10\frac{1}{4}$ inches (26 cm.) ; between the summits of the iliac crests $11\frac{1}{2}$ inches (28.75 cm.). Considerable shortening of these distances points towards contracted pelvis.

(3) The normal ratio of the distance between the spines, and the distance between the crests, is as $10\frac{1}{4}$ to $11\frac{1}{2}$. If the distance between the spines is either equal to or greater than the distance between the crests, the case is one of rachitic pelvis.

Internal pelvimetry is of much greater value than external pelvimetry. With the fingers we can measure the oblique conjugate, and from this latter we can then estimate the true conjugate. To measure the oblique conjugate, place the patient in the cross-bed position, and under an anæsthetic if possible. Introduce the index and middle fingers into the vagina, and pass them upwards until the promontory of the sacrum is reached. While the fingers are in this position, mark, with the nail of the index finger of the other hand, the spot at which the subpubic ligament crosses the index finger of the measuring hand. Then withdraw the fingers, and measure the distance between the tip of the middle finger and the mark on the index finger. This is the oblique conjugate. To obtain the true conjugate, half an inch

on an average must be subtracted ; the exact amount differs in every individual case. If the symphysis lies more horizontally, or if the promontory is lower than is normal, half an inch will be too much to

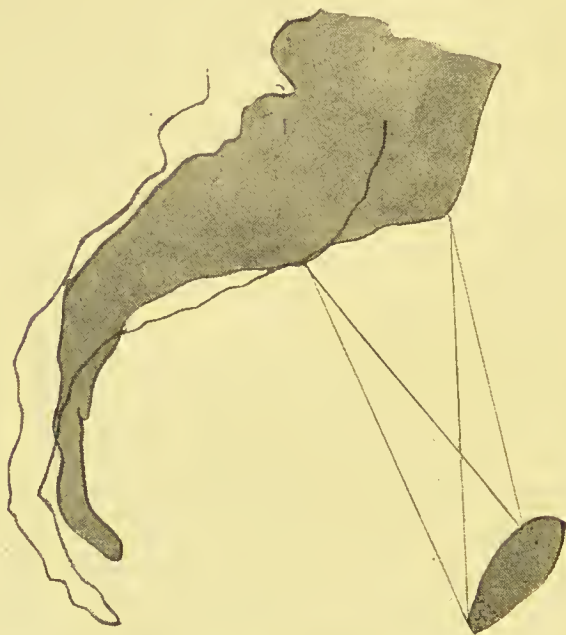


FIG. 34.—Diagram representing the manner in which the relationship between the true and the oblique conjugate is affected by the height of the promontory. (Modified from 'The Norris Text-book of Obstetrics.')

subtract. If the symphysis lies more vertically, or if the promontory is higher than is normal, half an inch will be too little (*v.* Figs. 34 and 35). Therefore, in order to ascertain the exact amount that it is necessary to subtract, we must allow for :—

- (1) The obliquity of the symphysis.
- (2) The height of the promontory.

The power of determining the proper correction to make can only be obtained by constant practice, under careful supervision. This is the great drawback to internal pelvimetry, to overcome which various forms of internal pelvimeters have been invented. Of these, very much the best is that bearing the name of Skutsch.



FIG. 35.—Diagram representing the manner in which the relationship of the true and the oblique conjugate is affected by the obliquity of the symphysis. (Modified from 'The Norris Text-book of Obstetrics.')

Skutsch's pelvimeter if carefully worked gives far more reliable information than the fingers (*v.* Figs. 36 and 37). It consists of three parts—a rigid limb with a slight curve upon it, a flexible limb, and a circular moveable bar which connects the two. The rigid and the flexible limbs lock into one another, in such a manner, that either the concave or the convex

aspect of the rigid bar can be turned towards the flexible bar. The moveable connecting bar is so adjusted that the limbs can be separated from one another, and then returned to exactly the same

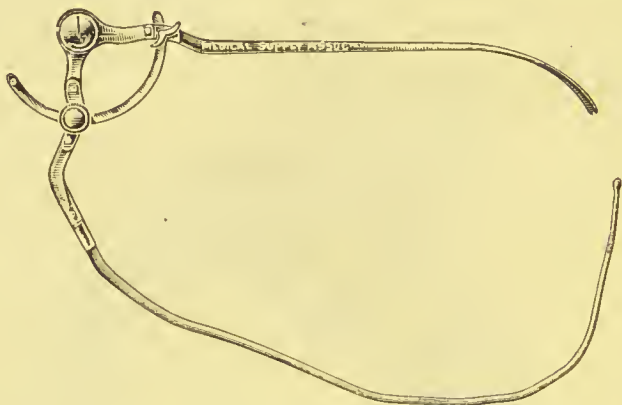


FIG. 36.—Skutsch's pelvimeter.

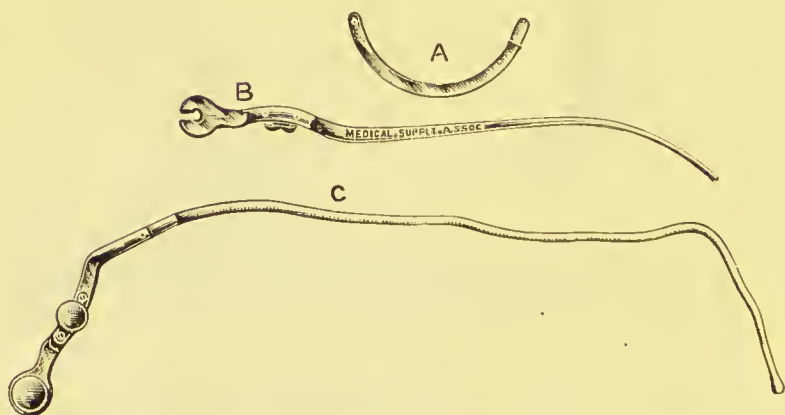


FIG. 37.—Skutsch's pelvimeter. A. Moveable connecting bar.
B. Rigid limb. C. Flexible limb.

position. This is necessary in order to facilitate its removal from the pelvis.

In order to use the pelvimeter, the patient requires as a rule to be under an anæsthetic. To measure the

conjugata vera a mark is made with an aniline pencil on the skin over the centre of the symphysis (*v.* Fig. 38). The instrument is then so adjusted that the rigid limb curves away from the flexible limb. Pass two fingers of the right hand into the vagina, and upwards until they lie against the promontory of the sacrum. Then slip the rigid limb of the instrument upwards, along the fingers, until it rests on



FIG. 38.—Diagram representing the distances measured, when ascertaining the length of the C.V.

the most prominent point of the promontory. Hold it exactly in this position while an assistant bends the flexible limb, until it just touches the blue mark over the symphysis (A B, Fig. 38). The instrument is then carefully withdrawn, and the distance between the extremities of the limbs measured. Next reverse the rigid limb, so that it curves towards the flexible one. Introduce the fingers again into the vagina and feel for the most prominent point of the back of the symphysis. Guide the rigid limb up until it

rests on this point; and hold it there while the assistant bends the flexible limb, until it presses against the blue mark with the same degree of force that it did when taking the first measurement (A C, Fig. 38). Separate the limbs before removing the instrument, as otherwise they might be forced apart. Then remove it, and adjust the limbs to their original position. Subtract the distance between them, *i. e.* the thickness of the symphysis, from the former measurement, and the result will be the length of the true conjugate.

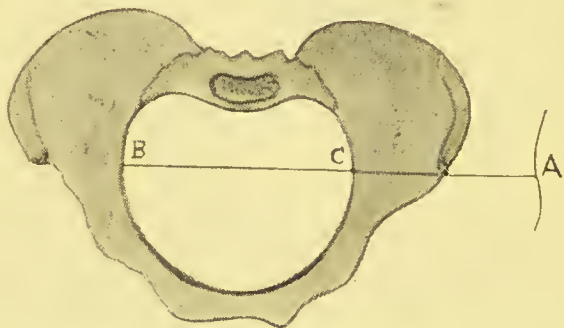


FIG. 39.—Diagram representing the distances measured, when ascertaining the length of the transverse diameter.

In order to measure the transverse diameter, make a mark over the great trochanter of the femur at one side (*v.* Fig. 39). With the rigid limb in the vagina, under the guidance of the right hand, measure the distance from this mark to the most distant point of the pelvic brim, at the opposite side (A B, Fig. 39). Then, in the same manner, but with the left hand in the vagina, measure the distance from the blue mark to the nearest point of the pelvic brim, on the same side as the mark (A C, Fig. 39). Subtract the

measurement thus obtained from the first measurement; the result is the transverse diameter. From these measurements we can deduce the nature and degree of the contraction.

Mechanism.—The mechanism of a vertex presentation differs considerably, in a case of contracted pelvis, from the mechanism which occurs in the case of a normal pelvis. The mechanism also varies in the different forms of contracted pelvis.

Generally Contracted Pelvis.—The most important point in the mechanism of this variety of pelvis is, that the normal flexion of the head is exaggerated; consequently, the small fontanelle lies relatively deeper in the pelvis than usual—posterior fontanelle presentation. With this exception, the mechanism is the same as in a normal pelvis.

Flat Pelvis.—The head engages with its sagittal suture lying in the transverse diameter of the brim. It then rotates round its occipito-frontal diameter, in such a manner, that the sagittal suture approaches the promontory of the sacrum, and the anterior parietal bone presents. This lateral deviation of the head is known as the obliquity of Naegele or anterior parietal presentation; it is excessively marked when there is much antero-posterior contraction of the pelvis. It is said, that, if the sagittal suture comes within three quarters of an inch of the promontory of the sacrum, the degree of contraction of the pelvis must be so great that delivery is impossible. In addition to Naegele's obliquity another movement of the head occurs. At first one parietal bone rests upon the symphysis, the other upon the promontory. As the uterus contracts the head is

pushed in the transverse diameter of the pelvis towards the side at which the occiput lies. This movement causes the bi-temporal diameter instead of the bi-parietal to lie in the conjugate, and also causes a certain amount of extension of the head. As a result of this, first, a diameter of $3\frac{3}{4}$ inches (9.5 cm.) is replaced by one of $3\frac{1}{5}$ inches (8 cm.), and secondly, the anterior fontanelle lies lowest— anterior fontanelle presentation. In this manner the head, if the contraction is not too great, passes the narrow brim.

Generally Contracted Flat Pelvis.—The mechanism in these cases is a combination of the mechanism that occurs in a generally contracted and in a flat pelvis. The head enters in the transverse diameter of the pelvis. Marked flexion occurs, so that the small fontanelle is situated more deeply than usual. Naegele's obliquity also occurs, so that the anterior parietal bone comes first through the brim.

Treatment.—Four degrees of contracted pelvis are met with. Together with their appropriate treatment, they are as follow :—

| Degree. | Measurement of C.V. | Treatment. |
|-----------|--|--|
| 1st . . . | 4— $3\frac{1}{2}$ inches (10—8.75 cm.) | { Prophylactic version ; or leave to nature,—i. e. allow the head to mould through the brim. |
| 2nd . . . | $3\frac{1}{2}$ —3 inches (8.75—7.5 cm.) | |
| 3rd . . . | 3—2 inches (7.5—5 cm.) | { Premature labour ; ver- sion ; symphysiotomy or Cæsarean section ; perforation. |
| 4th . . . | { below 2 inches (5 cm.) (absolute contraction) | |
| | | { Symphysiotomy or Cæ- sarean section ; per- foration. |
| | | { Cæsarean section. |

These measurements apply to flattened pelvis; in generally contracted pelvis they must be increased respectively by one-third of an inch, or roughly, one centimetre.

(1) In the first degree of contracted pelvis we have a choice between prophylactic version, and leaving the head to mould. I do not include the application of the forceps while the head is above the brim as a mode of treatment; because, if the forceps will bring a head through a contracted brim, the contractions of the uterus will also bring it through, with less danger to mother and child. When we make up our mind to allow the head to mould through the brim of itself, the only assistance we can render is by placing the patient on the correct side. In a generally contracted pelvis she should lie upon the side at which the posterior fontanelle is in order to favour its descent. In a flat pelvis she should lie at first upon the side at which the forehead is, in order to favour the descent of the anterior fontanelle, and, as soon as this takes place, upon the opposite side, to favour the descent of the occiput. With this exception, we leave the case absolutely to nature, until either the child dies, or until danger to the mother appears. If the child dies, there is no object in waiting any longer; perforate the head and extract. If symptoms of danger to the mother show themselves, we may give the forceps a trial, on the supposition that the contraction may not be so great as we think. If it fails, we must perforate. It is, of course, obvious that as soon as the head has passed the site of contraction, the forceps may be used if labour is still protracted, as the case has then

ceased to be one of contracted pelvis as far as the treatment is concerned. Prophylactic version consists in performing podalic version at the commencement of labour. This is done in pursuance of the fact that the head moulds better when compressed from below upwards, *i.e.* as an after-coming head, than it does when compressed from above downwards, *i.e.* as a fore-coming head. But, on the other hand, it must be remembered, that, when the head comes first, it may take an indefinite number of hours to come through the brim without detriment to the child. When the head comes last, it must be brought through the brim in at most one minute, or the child will die of asphyxia. The advantage given by Walcher's position is a strong argument in favour of prophylactic version, as it is easy to keep the patient in such an attitude for the short time necessary for the extraction of the after-coming head, but quite impossible to do so for the hours necessary for the moulding of the fore-coming head. Winckel's statistics, on the other hand, are strongly against the adoption of version, but Walcher's position was not then taken advantage of. They are as follows :—

| Method of Delivery. | Fœtal Mortality. | Maternal Mortality. |
|------------------------|---------------------|------------------------|
| Moulding . . . | 12 per cent. . . | * |
| Forceps . . . | 27·7 „ . . | 4 per cent. |
| Version . . . | 40·8 „ . . | 3 „ |

(2) For the second degree of pelvic contraction premature labour is undoubtedly the best treatment.

* If the treatment of moulding is properly carried out there should be no maternal mortality ; as, when danger to the mother appears, the child is at once extracted.

If we do not see the patient sufficiently early in pregnancy to adopt this mode of treatment, then prophylactic version or symphysiotomy is to be preferred. The objection to the former is that if we fail to deliver the after-coming head, we have substituted an operation which may be most difficult, *i. e.* perforation of the after-coming head, for one that is comparatively easy, *i. e.* perforation of the head coming first. The objection to the latter is the number of assistants it requires, and the difficulty of the after-treatment, Cæsarean section on this account is usually chosen in private practice. If none of these can be performed the child must be perforated.

(3) For the third degree of pelvic contraction symphysiotomy is the best treatment for its upper limits, *i. e.* for a *conjugata vera* of $2\frac{3}{4}$ inches or more; below that Cæsarean section, as far as we know at present, is safer. Perforation must be adopted if neither of these can be employed.

(4) For the fourth degree of pelvic contraction, *i. e.* absolute pelvic contraction, Cæsarean section is the only possible mode of delivery. Extraction of even a mutilated child is too dangerous an operation to be undertaken.

Walcher's position may be of considerable use, in any case in which a slight temporary enlargement of the conjugate diameter of the brim is required. It consists in placing the patient in the dorsal position, with her hips so over the edge of the bed that her legs hang freely down, without any support. The lower portion of her body then rests upon the sacrum, and the weight of the unsupported

lower limbs is transmitted through the ilio-femoral (Y-shaped) ligament to the pelvis. The movement which the sacro-iliac joints allow, permits as much of the pelvis as is formed by the innominate bones to be drawn downwards by the weight of the limbs, as if it was rotating round the sacro-iliac joints. In this way the symphysis comes to lie at a lower



FIG. 40.—Diagram showing the increase in the C.V., brought about by Walcher's position. The dotted outline represents the new position of the pelvis, when dragged downwards by the weight of the limbs. (Slightly modified from Fothergill.)

level than is usual, so increasing the *conjugata vera* (v. Fig. 40). The average increase in the latter is about two fifths of an inch (Fothergill).

Premature Labour.—The correct time at which to induce premature labour, for the different degrees of contractions, is shown in the following table :—

| Conjugata Vera. | | Time to Induce Labour. |
|--------------------|-----------|---------------------------|
| 3 inches (7.5 cm.) | | 30th week. |
| $3\frac{1}{4}$ " | | 32nd " |
| $3\frac{1}{2}$ " | | 36th " |

This manner of ascertaining the date at which to induce labour is open to two objections. In the first



FIG. 41.—Müller's method of ascertaining the date at which to induce labour.

place, it is extremely difficult to be certain that we are correct in our calculations of the duration of preg-

nancy. In the next place, even if we can tell the exact age of pregnancy, this table makes no allowance for the varying size of the child's head.

Müller's method of ascertaining the date at which to induce labour is much more exact; and allows both for the degree of contraction of the pelvis, and for the size of the child's head. It is carried out as follows:—Place the patient in the cross-bed position, or upon a Schroeder's gynæcological chair. Introduce two fingers into the vagina and palpate the presenting head. Then get an assistant to grasp the head through the abdominal wall, and to endeavour to push it down through the pelvic brim (*v.* Fig. 41). If he succeeds it is too soon to induce labour. This manipulation should be performed, at intervals of a few days, until the day comes that he cannot push it through the brim. The first day on which this occurs, is the day on which labour should be induced.

CHAPTER XXII.

SEPTIC INTOXICATION AND INFECTION.

Varieties—Sapræmia: Ætiology, Symptoms, Prognosis, Treatment
—Puerperal Ulcer: Treatment—Lymphatic Sepsis: Ætiology,
Symptoms, Prognosis, Treatment, Antistreptococcic Serum—
Pyæmia: Ætiology, Symptoms, Prognosis, Treatment.

INVASION of the genital tract during pregnancy or the puerperium by pathogenic bacteria manifests itself in three distinct forms:—

I. Sapræmia or septic intoxication.

II. Acute sepsis:—

(1) Lymphatic sepsis.

(2) Venous sepsis or pyæmia.

1. SAPRÆMIA.

Sapræmia or *septic intoxication* is the condition which arises from the absorption of the products of decomposition. Saprophytic organisms are carried into the vagina or uterus if air gains admission during or subsequent to the third stage of labour. They lodge in any dead matter, as blood-clots or portions of placenta, and there generate ptomaines. If there is any obstruction to the escape of the latter they are absorbed by the patient, and sapræmia results.

Ætiology.—The direct cause of sapræmia is the entrance of air laden with saprophytes into the

vagina or uterus, or the extension upwards of an external decomposition. The former occurs to some extent in almost every confinement; but sapræmia does not result, unless there is dead matter left for the saprophytes to feed upon. Improper management of the third stage of labour, *i. e.* premature expulsion of the placenta, is the common cause of the presence of dead matter in the uterus. Prolonged labour by causing crushing and so necrosis of the soft parts, the lateral position in the third stage by favouring the entrance of air, and the insufficient control of the fundus by allowing the uterus to fill with clots, are also well-recognised predisposing causes of sapræmia.

Symptoms.—The symptoms set in from the third to the fifth day after the birth of the child, and usually commence gradually. The temperature rises to 101° F. or 102° F., and the pulse becomes proportionately rapid. At the same time the lochial discharge has a foul smell. If the case is treated, the symptoms disappear; otherwise, the temperature rises higher on the following night, and the patient may have a slight rigor. If the case is still untreated, the symptoms become very much more marked, and the patient feels very ill indeed. Bacteria, which at the commencement were saprophytic, and so were only able to live upon dead matter, will, under suitable conditions, become pyogenic and capable of existing upon living tissues. These suitable conditions occur in the case of a neglected sapræmia. Consequently, the bacteria which have gained in virulence by feeding on portions of placenta and clots, now attack the uterine

itself and cause a septic endometritis. The chief symptom of this condition is a very foul-smelling and profuse discharge coming from a subinvolved uterus.

The bacteria may then extend in two ways. They may infect a laceration about the cervix, and so travel outwards into the tissues of the broad ligament, thus causing a parametric inflammation. They may extend into the tubes and so reach the peritoneal cavity. When they have reached the pelvic peritoneum, two terminations are possible. First, and more rarely, a general peritonitis may be set up, which will infallibly kill the patient. Secondly, a protective local peritonitis seals over the fimbriated extremities of the tubes, and thus prevents the inflammation extending beyond the pelvis. This is the commonest termination, and is the cause of subsequent adherent retro-deviations, fixed ovaries, and pyosalpinx.

From any of these conditions, viz. septic endometritis, salpingitis, or peritonitis, a general sepsis may result. The extension of the inflammation from the uterus is shown by intense pain, accompanied by considerable elevation of temperature, and by the occurrence of rigors. The presence of inflammatory exudations may be determined by vaginal examination, or by palpation of the lower part of the abdomen.

Prognosis.—If sapræmia is treated in time, the patient almost always recovers. If the condition is untreated, she may die from ptomaine poisoning, or from pyæmia. If extension of the inflammation to the tubes takes place, she may die of septic peritonitis; and even in the most favourable cases she

will be an invalid for a very long time, and perhaps for life.

Treatment.—The prophylactic treatment of sapræmia consists in the proper management of the third stage of labour. If sapræmia occurs it must be treated at once. When the symptoms first appear, raise the head of the bed slightly, and so favour free drainage from the vagina. With the same object administer a purgative, which, by causing bearing-down efforts, assists in emptying the vagina. If the third day is passed, the patient may be allowed to kneel up in bed when passing water. If in spite of this treatment the temperature still keeps high, she must be given a copious vaginal douche of hot creolin solution. If the decomposition is limited to the vagina, the temperature will then fall. If it still remains high the uterus is probably infected; accordingly a vaginal douche should be again administered, and followed by an intra-uterine douche. The former may be given with a glass nozzle, but for the latter a large-sized Bozeman's catheter must be used in order to permit of free return of the fluid. In the great majority of cases the temperature will now fall. If it still remains high, the uterus must be douched twice daily.

If the discharge remain foul in spite of two or three intra-uterine douches, the uterus should be carefully curetted with a blunt Rheinstädter's douche curette, in order to remove any portion of placenta or of membrane which has been left behind. The curetting should be thorough, but the greatest care must be taken that the uterus is not perforated. If

it is obvious that the inflammation has extended to the tubes, curetting is probably contra-indicated. There is always a slight risk that this latter may set up pyæmia, but the advantages gained from it more than counterbalance this risk. If the uterine cavity does not become aseptic after one curetting, the greatest benefit is obtained by the use of iodoform gauze. Plug the uterus night and morning as tightly as possible, after first douching it out thoroughly, and curetting it gently if thought advisable. This line of treatment should be followed until the uterine contents have become aseptic. If the infection extends beyond the uterus, and is localised, it is treated by rest until the acute stage has passed, and the pain relieved by hot abdominal stupes. If a general peritonitis occurs, the only chance for the patient consists in opening, washing out, and draining the peritoneal cavity. If a pelvic abscess forms, it should be opened and drained if possible *per vaginam*. If this cannot be done, we must, if possible, wait until the abscess points and then open it.

In all cases the diet of the patient must be attended to. She must get plenty of nutritious and digestible food. While the temperature is high, alcohol must be given in doses of from four to ten ounces in the day, in accordance with the severity of the case. The free use of ergot is also advisable, as, by promoting contraction of the uterus, it assists in expelling clots and lochia, and at the same time hinders absorption. One or two drachms may be given night and morning.

Puerperal ulcer.—This is a condition which may

accompany sapræmic infection, or may exist alone. It is an ulcer of varying size, with a grey sloughing base and an inflamed margin. It forms on lacerations of the genital tract, and causes a profuse foul discharge, accompanied by a rise of temperature and other slight constitutional disturbances.

Treatment.—The treatment is purely local, and consists in the careful washing away of all discharge and in the application of iodoform powder to the ulcer. Vaginal douching is contra-indicated, unless the vagina or uterus is also infected, lest the putrid discharge should be carried up into the uterus; instead of it, the head of the bed may be raised to favour free drainage. If it becomes necessary to douche, a very low pressure of water should be used.

It is often of great assistance to be able to distinguish healthy from putrid lochia, at a glance. This is done by examining the stain which the lochia leaves upon the sheet or diaper. Healthy lochia causes a stain resembling that left by a drop of blood. It is deep red in the centre, and fades away gradually into a purely serous margin. Putrid lochia causes an exactly opposite variety of stain. It has a hard, deeply stained edge, and the colour fades slightly towards the centre of the stain.

II. ACUTE SEPSIS.

Acute sepsis is the condition which arises from the direct invasion of the system by pyogenic bacteria. It is divided, according to the path by which the bacteria reach the system, into :—

- (1) Lymphatic sepsis.
- (2) Venous sepsis or pyæmia.

LYMPHATIC SEPSIS.

Lymphatic sepsis is the term applied to the condition that results from the entrance of pyogenic bacteria into the circulation of the patient, *viâ* the lymphatics. It is the most fatal disease to which puerperal women are liable.

Ætiology.—Lymphatic sepsis in puerperal women is due to the inoculation of some part of the genital tract with *Streptococcus pyogenes*, which has been introduced by the fingers or instruments of the medical attendant or nurse.

Symptoms.—The symptoms appear from twenty-four to fifty hours after inoculation. They are usually ushered in by a severe rigor, during which the temperature rises to 104° F. or 106° F. The pulse is exceedingly frequent, and is even out of proportion to the temperature. The rigor may or may not recur; the patient is at first bathed in a profuse cold sweat, and later all sweating may cease, to come on again just before death. The secretions peculiar to the puerperium, *i. e.* the lochia and milk, cease completely, if they are ever properly established. The patient looks extremely ill, and is absolutely sleepless. Her face is pinched, and has a subicteric tinge; the angles of the mouth and nose are drawn down; and the eyes appear sunken into the head. A very common symptom is extreme depression. In some of the worst cases, however, the patient may say that she feels extremely well, and may even wish to be allowed up (*v.* page 136). This condition is known as *euphoria*, and is due to the fact that the higher centres are dulled by the

poison which is circulating in the system. It is a sign of the worst possible import. A frequent concomitant of the general infection of the patient is a diffuse septic peritonitis. The duration of the disease is at the most a week, frequently only a couple of days. The temperature rises during the entire time, and may reach 106° F. or 107° F. Towards the last the heart fails rapidly.

Prognosis.—A short time ago the prognosis was absolutely bad, but it has been somewhat improved by the introduction of antistreptococcic serum. Formerly if the patient recovered, it was most probable that the diagnosis was incorrect.

Treatment.—When the symptoms appear, the vagina and uterus should be douched, on the chance that the attack may be due to a local infection. If, however, the symptoms do not improve rapidly, it is useless to continue the douches. The only drug that seems to be of any avail is alcohol, and it should be pushed to the utmost extent. The patient must be given literally as much as she can be urged to take, and this is rarely more than sixteen to twenty ounces in the twenty-four hours.

During the last few years, there has been a considerable amount of attention paid to the effects of antistreptococcic serum. Many favourable instances of its use have been recorded, and the trend of evidence is to show its value. Undoubtedly several cases of acute sepsis have recovered under its use; but also many cases of purely sapræmic infection have been treated with it, under the belief that they were, or for fear that they might be, acute sepsis. And of course from the fact that such cases re-

covered, we can deduce nothing as regards the efficacy of the serum in the graver infection.

Professor Denys, of Louvain University, and Dr. Leclef have together made a careful investigation into its efficacy. From experiments made upon rabbits, and from the use of the serum in cases of streptococcic infection, they have come to certain conclusions. Briefly summarised, these are as follows :—*

(1) That the majority of cases of puerperal *streptococcic* infection are benefited by the use of the serum. That a certain number of cases are not benefited, either because the serum is not sufficiently active, sufficiently recently made, or because the infection is due to some organism other than *Streptococcus pyogenes*.

(2) That to be of avail, a sufficiently large quantity of the serum must be administered. Dr. Denys recommends that from 50 c.c. to 200 c.c. be used in proportion to the severity of the case. (This was before the introduction of the stronger serum which is now in use.)

(3) That this dose must be administered at one time, or at any rate within twenty-four hours.

(4) That there must be no hesitation in administering the serum at once, otherwise it may be too late.

(5) That the serum must be properly prepared ; that it must be as recently prepared as possible ; and that the infection must be due to *Streptococcus pyogenes*.

* From a communication read before Le Cercle Medical de Louvain on May 15th, 1896.

With the stronger serum which is now used, the amount is—for the first injection 20 c.c., then 10 c.c. once or twice every twelve hours until considerable improvement is manifested. As soon as this occurs, the amount and the frequency may be diminished. When using the serum, strict precaution must be taken to ensure the asepsis of the syringe with which it is injected, and of the skin through which the puncture is made.

VENOUS SEPSIS.

There appear to be two chief differences between lymphatic sepsis and venous sepsis or pyæmia:—

(1) That in the former the infection is conveyed to the general circulation *viâ* the lymphatics, in the latter *viâ* the veins by emboli starting from an already infected thrombus in the uterine sinuses.

(2) That, in the former, the virulence of the invading bacteria is so great, that the patient dies before any gross pathological changes have time to occur in the body; whilst in the latter, the virulence is so diminished, that although sufficient to set up symptoms of septic poisoning, still it is not sufficient to kill the patient before certain pathological changes have occurred. These changes if carefully examined into will be most frequently found to be directed towards the limitation of the distribution of the poison, and so to be protective.

Ætiology.—Pyæmia is due to the infection of the patient through the veins with pyogenic bacteria. The infecting bacterium, in most cases, is morphologically the same as that which causes acute sepsis, *i. e.* *Streptococcus pyogenes*; doubtless mixed forms

of infection occur also. In most cases the bacteria are at first lodged in the clots which fill the uterine sinuses, and are carried on emboli into the general circulation as the clots break down. Pyæmia may also result from a neglected sapræmia.*

Symptoms.—The onset of the symptoms does not, as a rule, take place until the tenth day after delivery. The patient may have had an apparently normal puerperium up to that date, or she may have suffered from sapræmic infection of the uterus. The onset is marked by the occurrence of a severe rigor, followed by a rapid elevation of temperature, up to 104° F. or 106° F. The pulse rate increases proportionately. In a few hours the temperature falls to normal, and the patient may appear to be as well as she was previous to the attack. Another rigor, however, follows in from twelve to twenty-four hours, and is followed by others at shorter intervals, corresponding to the infection of hitherto exempted tissues by fresh emboli. Finally, the temperature fluctuates continuously between 100° F. and 106° F.

In from three days to a week after the onset of the symptoms, metastatic abscesses form. These may occur in any part of the body, but, as a rule, will follow one of two definite courses. Either they form in the superficial parts of the body, as in the joints or subcutaneously; or they occur in the deeper organs, as in the liver, lungs, and brain. The

* It must be remembered that the entrance of staphylococci and streptococci into the uterus does not necessarily result in acute sepsis or pyæmia. In some cases the infection remains local, causing a septic endometritis with its train of resultant conditions, as described under sapræmia.

formation of each abscess is marked by the occurrence of rigors. The patient may gradually recover, but as frequently dies. Death may occur in several ways:—from exhaustion due to the long-continued suppuration; from septic pneumonia, peritonitis, or endocarditis; or from abscesses forming in vital organs, as the liver and the brain.

Prognosis.—The prognosis is very grave, but it is not quite as bad as in acute sepsis. The more superficially the abscesses form, the better is the prognosis. From 50 to 60 per cent. of cases were formerly said to die. This number has been considerably lessened by the use of antistreptococcic serum.

Treatment.—Support the patient's strength in every way. Administer alcohol in as large quantities as the patient can be induced to take, and give the most nutritious and digestible foods. If there is any local condition of the uterus or vagina, as septic endometritis or vaginitis, it should be treated by curetting, and by plugging with iodoform gauze. If abscesses form in joints they should be opened at once, in order to prevent, if possible, the destruction of the joint. If they form beneath the skin or muscles, they may be allowed to point before they are opened. In these cases, as in acute sepsis, the hypodermic injection of antistreptococcic serum has been attended by favourable results. It is used as in lymphatic sepsis.

CHAPTER XXIII.

PULMONARY EMBOLUS—INVERSIO UTERI—MASTITIS
—HÆMATOMA OF THE VULVA—PHLEGMASIA ALBA
DOLENS—PUERPERAL INSANITY.

Pulmonary Embolus: *Ætiology*, Symptoms, Treatment—*Inversio Uteri*: *Ætiology*, Symptoms, Treatment—*Mastitis*: Varieties—*Parenchymatous Mastitis*: *Ætiology*, Symptoms—*Interstitial Mastitis*: *Ætiology*, Symptoms, Treatment—*Hæmatoma of the Vagina or the Vulva*: *Ætiology*, Symptoms, Terminations, Prognosis—*Phlegmasia alba dolens*: Varieties, *Ætiology*, Symptoms, Treatment—*Puerperal Insanity*: *Ætiology*, Varieties, Symptoms, Treatment.

PULMONARY EMBOLUS.

PULMONARY embolus occurring after delivery is due to the detachment of a clot, most usually from the uterine sinuses, the clot being carried through the right side of the heart into the pulmonary artery.

Ætiology.—Extensive clotting is most likely to occur in cases in which the uterus has not contracted well after delivery. If clotting in the vessels has occurred, any slight movement may be sufficient to determine the detachment of the embolus.

Symptoms.—The onset of the symptoms is extremely rapid. The patient is perfectly well one moment, and the next she is collapsed, asphyxiated, her heart rapid and weak, her breathing frequent

and sighing. The duration of the symptoms depends upon the size of the vessel plugged, and upon the strength of the patient. If a large vessel is obliterated, she will die in from a few minutes to a few hours. If the vessel is small, she may recover very gradually.

Treatment.—The patient must be kept absolutely at rest in a sitting or semi-sitting position supported by pillows, and stimulants administered freely. Carbonate of ammonia in large doses is specially recommended as being very rapidly absorbed. Inhalations of oxygen are of doubtful efficacy.

INVERSIO UTERI.

Acute inversion of the uterus is one of the rarest accidents met with in midwifery. The uterus becomes partly, or completely, turned inside out, so that the fundus appears through the cervix.

Ætiology.—The occurrence of inversion is most probable, in the case of a large, lax, thin-walled uterus. It has been caused by:—

(1) Dragging on the placental site by means of the cord while the placenta is firmly adherent.

(2) Violent straining associated with sudden emptying of the uterus;—precipitate labour, severe straining and pressure in the removal of the after-birth (Winckel).

Symptoms.—The occurrence of inversion is usually followed immediately by the extreme collapse of the patient; more rarely the collapse does not come on for some hours. There may or may not be severe hæmorrhage.

Treatment.—If the placenta is still adherent, it should be removed and the uterus immediately replaced by the hand. The latter must then be thoroughly douched with creolin solution, and plugged with iodoform gauze to promote contraction.

MASTITIS.

Mastitis is the term applied to inflammation of the breast.

Varieties.—It occurs in two chief forms:—

(1) Parenchymatous.

(2) Interstitial.

(1) **Parenchymatous mastitis.** This is the term applied to inflammation of the milk ducts and glands, *i. e.* of the parenchyma of the breast.

Ætiology.—Parenchymatous mastitis is due to the entrance of bacteria through the milk duct. The bacteria may be derived from the milk, which has been allowed to dry upon the nipple, or infection may result from attempts made with septic fingers to form the nipples.

Symptoms.—The first symptom is the appearance of a patch of inflammation over some part of the breast, accompanied by considerable pain. As the inflammation is at first limited to the ducts, and as it is, as a rule, only one set of ducts which is infected, so the area of inflammation corresponds in shape to the area from which the affected ducts come. The affected patch is hence triangular in shape, with the apex of the triangle at the nipple, the base at the periphery of the breast. There is a sharp line of demarcation between the healthy and the diseased portions of the breast. The inflammation usually

tends to subside, but it may extend into the interstitial substance of the breast.

(2) **Interstitial mastitis.** This is the term applied to inflammation of the interstitial tissues of the breast.

Ætiology.—Interstitial mastitis may start by the extension of a parenchymatous mastitis; or, what is more common, bacteria may find their way directly into the interstitial substance through a crack at the top or the base of the nipple.

Symptoms.—An irregular ill-defined patch of inflammation appears upon the breast; there is intense pain, and severe constitutional disturbance, as high temperature, rapid pulse, and general malaise. As a rule the affected area suppurates, and an abscess is formed. The presence of pus is recognised not by fluctuation, which is difficult and sometimes impossible to obtain unless the abscess is very superficial, but by the presence of œdema over the point of supuration.

Treatment.—The prophylactic treatment of mastitis should be adopted in all cases, but particularly with primiparæ. It consists in hardening the skin of the nipples in order to avoid subsequent laceration (*v.* page 61), and in instructing the patient in the duty of keeping her nipples clean. They should be washed both before, and after, the child takes the breast. Also, milk should not be allowed to accumulate in the breast, if, for any reason, the child stops nursing. This condition, though not in itself sufficient to cause mastitis, still provides a suitable nidus for any germs that may gain admittance. If a crack occurs on or round the nipple, it must be cured as quickly as

possible. This is done by touching the crack lightly with nitrate of silver, or better still by painting it twice daily with Tr. Benzoin. Co. If *parenchymatous* mastitis occurs, the breast should be firmly bandaged to the chest wall, the nipple being first covered with a small piece of lint soaked in a fifty per cent. solution of Tr. Benzoin. Co. It is well also to administer a hydragogue purgative.

If we believe the mastitis to be *interstitial*, and pus to be likely to form, antiseptic compresses may be used to prepare the skin for incision. If an abscess forms it must be opened immediately. The occurrence of œdema is a positive indication of the presence of pus; it is rare to be able to obtain fluctuation. The following treatment of abscess of the breast is most successful.—Open into the most dependent part of the abscess by a radial incision, sufficiently large to admit the index finger. Let the pus drain out, and then pass in the finger, and with it break down all the diseased tissue. By this means the walls of the loculi in which the pus is stored are broken down, and one large cavity is formed. Next curette the cavity with a large curette, choosing one which is not too sharp, and douche it out thoroughly, so as to wash away all the *débris*. Plug the cavity tightly with iodoform gauze, and bandage the breast as firmly as possible to the chest-wall.

The gauze must be changed every twenty-four hours, and the cavity replugged, until the day comes upon which there is no pus on the gauze. This date varies from the second to the sixth day after opening, according to the size of the abscess.

Then the plugging may be discontinued, with the exception of a small piece of ganze in the skin wound in order to keep it open. The breast is bandaged very tightly, so as to bring the walls of the cavity into apposition. After this, it need not be dressed for three or four days. By this time the cavity will have become completely obliterated, and only a small superficial ulcer will remain, which will take a week or so to heal completely. By adopting the above treatment, the worst mammary abscess will be completely healed in from two to three weeks, if care is taken to break down *all* the diseased tissue at the commencement.

HÆMATOMA OF THE VAGINA OR VULVA.

Hæmatoma of the vagina or vulva is the term applied to a collection of blood in the areolar tissues about the vagina or vulva (*v.* Fig. 42).

Ætiology.—As the head descends through the vagina, the return flow of blood through the veins is obstructed, and so the intra-venous pressure is increased. Rupture of a vein may then result.

Varicosities of the vulvar or vaginal veins do not appear to predispose to this condition.

Symptoms.—The condition commences with the formation of a small tumour, elastic to the touch and of a blue colour, which gradually increases in size. The vein may rupture before or after delivery, but most usually the condition is not noticed until after delivery. The other symptoms are pain and collapse of the patient, both in proportion to the size of the tumour.

Terminations.—The case may terminate in four ways if the condition remains untreated :—

- (1) The tumour may rupture, and free external hæmorrhage result.
- (2) The hæmorrhage may extend interstitially upwards towards the abdomen, or downwards towards the perinæum, according as the ruptured vessel is above or below the

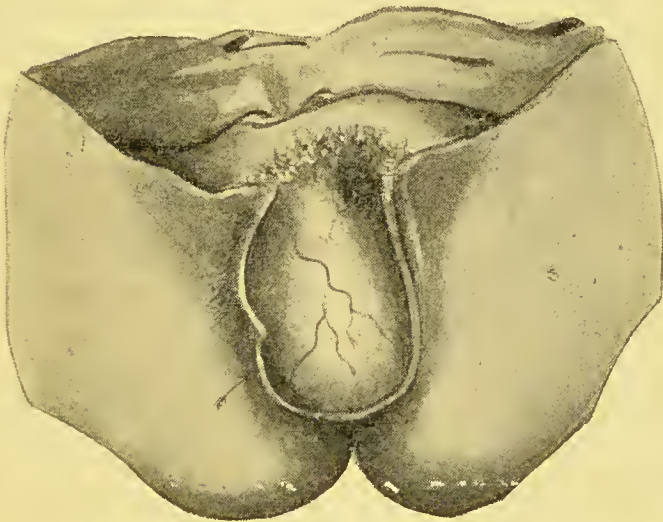


FIG. 42.—Hæmatoma of the left labium. The arrow points to the entrance to the vagina. (Drawn from life.)

deep perinæal fascia. The patient may thus “bleed to death into her subcutaneous tissue.”

- (3) The tumour if small may be absorbed aseptically.
- (4) Suppuration or decomposition of the contents of the tumour may occur.

Treatment.—If the condition is recognised before

delivery, deliver at once. It will usually be possible to apply forceps. If the large size of the tumour obstructs delivery, it must be incised, its contents turned out, and the child delivered past it as rapidly as possible. If the tumour increases in size after delivery, and pressure fails to check it, it must also be opened, and its contents turned out. In any case in which incision is practised, and in which the cavity is of large size, the latter should be douched out, and then plugged tightly with iodoform gauze. The plugging is changed every day until the cavity is obliterated. If the cavity is not very large it may be possible to close it by means of deep sutures passed beneath it.

If the tumour is very small, it may be left to absorb. Suppuration should never occur; if it does the abscess must be opened at the spot at which it points, and free drainage permitted.

Prognosis.—The prognosis depends upon the treatment adopted. The patient may die of hæmorrhage or of sepsis. Neither should occur if the case is correctly treated.

PHLEGMASIA ALBA DOLENS.

Phlegmasia alba dolens, or white leg, is the term applied to the condition which results from thrombosis of one or more of the veins of the leg.

Varieties.—There are two main varieties of phlegmasia :—

- (1) *Primary.*—The so-called marantic variety.
- (2) *Secondary.*—
 - (a) Septic.
 - (b) Simple.

Ætiology.—The primary or marantic form is due to simple thrombosis of the veins of the leg, such as may occur in any condition of debility. Weak action of the heart, and the pressure of an enlarged puerperal uterus on the iliac veins, combine to favour its occurrence. Of the secondary varieties the septic form is secondary to inflammatory changes in the uterine veins. Bacteria travel from the uterine sinuses along the walls of the vein, perhaps by the lymphatic canals. They set up an inflammation in one or more of the veins of the leg, this inflammation in turn causing the formation of a thrombus. The simple form is due to the extension of clotting, which has started in the uterine sinuses, downwards into the veins of the thigh.

Symptoms.—The simple forms usually come on a few days after the patient has been allowed out of bed. The leg becomes painful, and it may be possible to determine the presence of the thrombosis by running the hand lightly down the back of the calf. If the thrombus forms in one of the large veins of the thigh, the limb below the obstruction becomes very much swollen, œdematous, and extremely tender to the slightest touch. In the secondary septic form pain is felt in one or two distinct foci along the course of the vein. These foci become inflamed and swollen in a day or two, and subsequently a small abscess may form, which points and bursts. The temperature at the same time ranges from 101° F. to 104° F., and the pulse is proportionately rapid.

Treatment.—The treatment of either form consists in absolute rest in the recumbent position. The

bowels should be kept free by means of purgatives, and the patient's strength increased by means of nourishment, stimulants, and the administration of iron and strychnine. Cold evaporating lotions applied on lint will relieve the pain, in the primary form. The limb should also be wrapped in cotton wool, and protected by means of a cradle from the pressure of the bedclothes. No friction of any kind must be attempted, for fear of separating a portion of the clot. The septic form is best treated by hot antiseptic compresses over the inflamed areas and elevation of the limb.

PUERPERAL INSANITY.

Puerperal insanity is the term applied to a form of madness which sometimes occurs during pregnancy, or the puerperium, or as a result of over-lactation. It may last for the remainder of the patient's life, but in the majority of cases is only a temporary affection.

Ætiology.—Insanity may be a primary condition, the result of heredity, alcoholism, or epilepsy; or it may be merely a symptom of sepsis.

Varieties.—Two varieties are met with :—

(1) Melancholia.

(2) Mania.

Symptoms.—Mania rarely occurs except during the puerperium. Melancholia may also occur at that time, but is most frequently the result of over-lactation. When either form occurs during the puerperium its symptoms usually come on from two to twelve days after delivery. In *melancholia* the patient is extremely depressed, and is frequently found in tears, without any apparent cause. This in

itself should be sufficient to direct attention to her condition. If a patient is found to be continually fretting after delivery, without cause, she is probably suffering either from melancholia or sepsis, or perhaps both. She is usually absolutely sleepless, and may have various delusions. In *mania* the patient loses all idea of her surroundings, her mind is in a state of chaotic confusion, her moral faculties are affected. One moment she is extremely violent, the next passive and docile. She is the victim of delusions and illusions.

Treatment.—The patient must be watched with the greatest care. She is particularly liable to commit suicide if she is suffering from melancholia. Plenty of nourishing food must be given, if necessary by means of an œsophageal tube. Sleep must be obtained, if necessary by the administration of hypnotics. In *mania*, chloral and bromides may also be administered with the object of quieting the patient, and purgatives are always required. If any septic condition is present it must be treated.

Prognosis.—More than half the cases recover within six months, but if there is any trace of hereditary taint, the patients are always liable to a relapse during or after subsequent confinements.

CHAPTER XXIV.

LACERATIONS OF THE GENITAL TRACT.

Rupture of the Uterus: Ætiology, Symptoms, Treatment, Dangers
—Laceration of the Cervix—Laceration of the Perinæum:
Dangers, Treatment.

RUPTURE OF THE UTERUS.

RUPTURE of the uterus may occur at any stage of labour. It is a rare accident, but is perhaps not quite so rare as is usually believed. Any portion of the uterus may rupture, but, with a very few exceptions, the rupture always commences in the thinned lower uterine segment (*v.* page 36) (*v.* Figs. 43 and 44). Starting from there, it may extend in any direction—upwards towards the fundus, downwards towards the vagina, or circularly round the uterus. In this last case the entire lower uterine segment may be torn off. A distinct variety of rupture, viz. rupture by attrition, or rubbing through, of a portion of the uterine wall, is sometimes met with. This particularly happens in cases of flattened pelvis, where the uterus may become caught between the descending head and the promontory of the sacrum. In these cases a circular hole may be completely rubbed through the wall of the uterus; or, more commonly perhaps, the vitality of the compressed portion may be so destroyed that it

sloughs away after delivery. There are two degrees of rupture :—

- (1) Complete.
- (2) Incomplete.

In the first the laceration extends through the uterus and the investing peritoneum. In the second

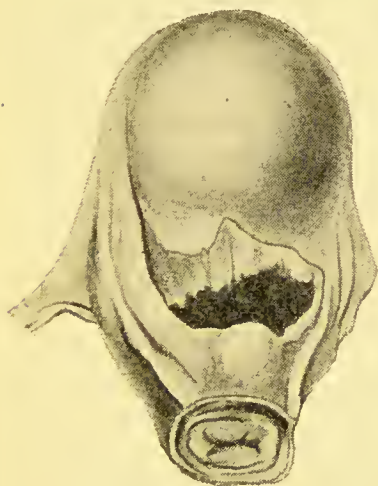


FIG. 43.—Rupture of thinned-out lower uterine segment. (Spiegelberg.)

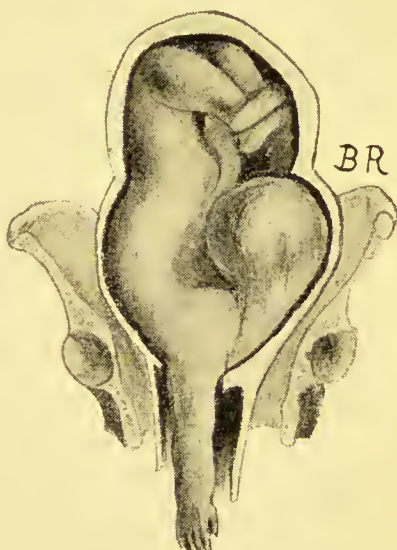


FIG. 44.—Thinning of lower uterine segment in a case of obstructed delivery. BR—Contraction ring. (Modified from Schroeder.)

the peritoneum is intact, and accordingly there is no communication between the uterus and the peritoneal cavity.

Ætiology.—The chief causes of ruptured uterus are :—

- (1) Obstructed delivery from any cause, as,—contracted pelvis, cross-births, hydrocephalic head, tumours blocking the pelvis, &c.

- (2) Fatty degeneration of the uterus.
- (3) A weak cicatrix resulting from a former Cæsarean section.

(1) In obstructed delivery rupture always commences in the lower uterine segment. This is easily understood when we remember the result of the retraction of the muscle fibres by which the fundus becomes thicker, at the expense of the lower uterine segment (*v.* page 36).

(2) In fatty degeneration rupture may occur in any part of the uterus. It may occur at the commencement of labour, and cannot be foreseen.

(3) The cicatrix, resulting from former Cæsarean section, may rupture during a subsequent labour if it is not firmly united.

Symptoms.—It is best to consider the symptoms of rupture of the uterus under three heads, *viz.* :—

- (1) Threatened rupture.
- (2) Sudden rupture.
- (3) Gradual rupture.

(1) *Threatened Rupture.*—The symptoms of threatened rupture of the uterus are :—a rising temperature—above 101° F.; an increasing pulse rate—more than 110 per minute; continuous or tonic uterine contractions; the contraction ring felt more than 1½ inches above the symphysis; ballooning of the vault of the vagina; standing out and tenseness of one or both round ligaments.

(2) *Sudden Rupture.*—The symptoms of sudden rupture are :—a sensation as if something had burst internally; cessation of labour pains; recession of the presenting part, unless it is already fixed; collapse, rapid pulse, falling temperature, all in

proportion to the amount of hæmorrhage that is occurring; intense pain over the abdomen. These are the classical symptoms, but any or all of them may be absent.

(3) *Gradual Rupture*.—This is the commonest manner in which rupture occurs, and its symptoms are ill-defined. Nothing abnormal may be noticed until the time comes to remove the placenta, when upon introducing the hand into the uterus the rent is discovered. If there is hæmorrhage, there will, of course, be the symptoms of collapse. If rupture is so extensive that the child escapes into the abdomen, the empty uterus may be felt by abdominal palpation lying tightly contracted at the pelvic brim; and the foetal parts will be felt with unusual distinctness.

Treatment.—The treatment is prophylactic or curative as the case may require.

Prophylactic Treatment.—The prophylactic treatment consists in correcting malpresentations of the child or obliquity of the uterus, and in immediate delivery, if the indications of threatened rupture appear. If the anterior lip descends in front of the head, and becomes caught between it and the symphysis, it must be pushed above the convexity of the head, and kept there during a pain. It will then remain up of itself.

Curative Treatment.—The curative treatment depends entirely upon the condition of affairs present. If the child is undelivered when the rupture is diagnosed, it must be delivered at once. If it is in the uterus, perforate; if it has escaped into the abdomen, laparotomy is necessary. If there is much

hæmorrhage from the laceration, the uterus must be removed. If the child is already delivered before the rent is noticed, the treatment to be adopted depends upon the amount of hæmorrhage. Remove the placenta; and, if there is no hæmorrhage to signify, pass a strip of gauze through the rent, so as to allow drainage. No further treatment is necessary. The gauze should be removed in twenty-four hours. If there is much hæmorrhage, laparotomy followed by removal of the uterus is indicated. The operation of election in these cases is supra-vaginal amputation of the uterus with retro-peritoneal treatment of the stump, or possibly pan-hysterectomy may be preferred. But, in some cases, owing to the condition of the patient, it may be necessary to perform the classical Porro's operation, as it can be done more rapidly.

Dangers.—The dangers of rupture of the uterus are :—

(1) Hæmorrhage.

(2) Sepsis.

If the former occurs it must be treated as described. The latter will not occur in a healthy patient, if one is habitually aseptic.

LACERATION OF THE CERVIX.

Lacerations of the cervix are seldom recognised unless they cause hæmorrhage. Their treatment in that case is described under Post-partum hæmorrhage.

LACERATION OF THE PERINEUM.

This is one of the commonest accidents occurring

in midwifery. It occurs far more frequently than is supposed; as, unless it is looked for with care, it may not be noticed. There are two degrees of laceration of the perinæum:—

(1) *Complete*, where the laceration extends right through the perinæal body into the rectum.

(2) *Incomplete*, where the laceration involves the perinæal body alone.

Treatment.—Lacerations of the perinæum must be sutured immediately, for two important reasons:—

(1) To avoid the formation of a puerperal ulcer (*v.* page 265).

(2) To guard against future prolapse of the uterus. A deep laceration of the perinæum almost always involves the levator ani muscle. If this remains ununited the anterior vaginal wall has lost its support, and the integrity of the floor of the pelvis is destroyed.

The operation for a complete laceration is as follows:—The first step consists in turning the complete laceration into an incomplete laceration, by suturing the rent in the anterior rectal wall. This may be done, if the rent is small—up to half an inch in depth—by means of a purse-string suture which runs round the laceration. If the tear in the rectal wall is large, it is better to suture it by means of a continuous catgut suture. This afterwards is buried when the remainder of the perinæum is sutured (*v.* Fig. 45).

The complete laceration is now turned into an incomplete laceration, and the latter is in turn sutured by stitches passed from the external aspect

of the perinæum. They are entered at the side of the laceration, passed almost to the bottom of it, and brought out at the corresponding point upon the other side. They must be tied from behind forwards; and incomparably the best material to



FIG. 45.—Complete laceration of perinæum with continuous catgut suture in rectal and vaginal tear. (Modified from 'The Norris Text-book of Obstetrics'.)

use is silkworm gut, as it does not absorb the discharge. If the laceration extends for any considerable distance up the posterior vaginal wall, it must be stitched separately with a continuous catgut suture, the stitches being passed from the vagina.

The accompanying figure shows the method of procedure better than any words (*v.* Fig. 46). The

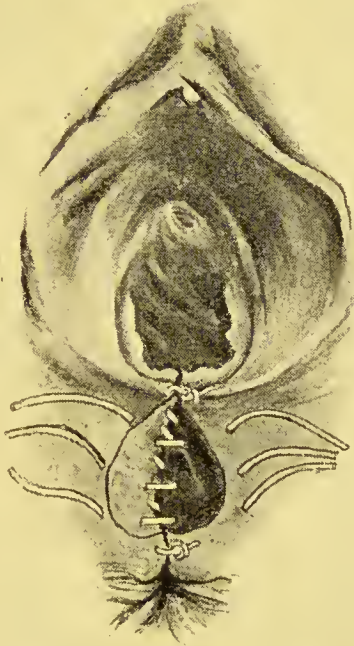


FIG. 46.—Complete laceration of perinaeum turned into an incomplete laceration by suturing rectal tear. Continuous suture in vaginal wall, and perineal sutures in position. (Modified from 'The Norris Text-book of Obstetrics.')

stitches should be removed on the seventh day, unless they are catgut, which is absorbed.

CHAPTER XXV.

INDUCTION OF ABORTION AND PREMATURE LABOUR.

Induction of Abortion: Indications, Methods—Induction of Premature Labour: Indications, Methods; Version, Plugging the Vagina, Catheterisation of the Uterus, Intra-uterine Injection of Water or Glycerine, Dilatation of the Cervix, Rupture of the Membranes.

INDUCTION OF ABORTION.

INDUCTION of abortion is the term applied to the bringing on of labour before the child is viable, *i. e.* before the twenty-eighth week. It is only justifiable under very exceptional circumstances.

Indications.—Abortion should be induced only in order to save the life of the mother. It is indicated in :—

(1) Cases of retroflexion of the pregnant uterus, which cannot be replaced.

(2) In certain diseases of pregnancy, as hyperemesis; and, perhaps, in exceptional cases of cardiac, renal, or pulmonary affections.

(3) In cases of contracted pelvis, in which the child cannot be born alive. This last indication is not admitted by many good authorities, who hold that a Cæsarean section at full term, and not artificial abortion, should terminate the pregnancy.

Methods.—Before the formation of the placenta (*i. e.* before the fourth month), dilate the cervix, and remove the ovum with the finger. The dilatation may be commenced by means of sea-tangle tents, and completed by means of Hegar's dilators. From the fourth to the sixth month, puncture the membranes with a stilette. From the sixth month induce labour by Krauze's method, as described under the "induction of premature labour" (*v.* page 295).

THE INDUCTION OF PREMATURE LABOUR.

Premature labour is the term applied to the occurrence of labour any time after the child is viable, but before full term. As the operation is usually performed in order to save the child's life, it is almost useless to attempt it before the thirtieth week. Theoretically, the child may be considered viable after the twenty-eighth week. Practically, the mortality among infants born before the thirtieth week is so high, that it is useless to induce labour, in order to save the child's life, before that time. Again, in cases of contracted pelvis, which is perhaps the most frequent indication, it is useless to induce labour after the thirty-sixth week. The transverse diameter of the child's head has reached its maximum size by this date, and labour induced after this will not procure an easier confinement, but will bring into the world a weaker child, than if the case is allowed go to term.

Indications.—Premature labour may require to be induced for any of the following reasons:—

(1) Contracted pelvis measuring from 3 to $3\frac{1}{2}$ inches in the *conjugata vera*.

(2) Habitual death of the fœtus at some period after it has become viable, except when due to syphilis.

(3) Ante-partum hæmorrhage.

(4) Hydramnios causing urgent heart symptoms.

(5) Certain diseases of pregnancy, as hyperemesis; and, perhaps, in exceptional cases of cardiac, pulmonary, and renal disease. Eclampsia is added by some of the best authorities.

Methods.—There are many methods of inducing premature labour, and no one method will suit every case. The method we adopt depends upon the indication for its adoption. I shall first give the various methods, and then discuss them. Premature labour may be induced, or is said to have been induced, by:—

(1) Podalic version, and rupture of the membranes.

(2) Plugging the vagina.

(3) Catheterisation of the uterus.

(4) Intra-uterine injection of liquids, as glycerine or water.

(5) Dilatation of the cervix, digitally, or with Barnes' bags.

(6) Rupture of the membranes.

(7) Electricity.

(8) Vaginal douching.

(9) So-called ecbolics.

(10) Cupping the breasts.

(1) *Version*, followed by rupture of the membranes, is the method to be adopted in certain cases of placenta prævia. It at the same time checks the hæmorrhage and induces labour, which are the two

things we require. This method will be discussed in full later (*v.* page 311).

(2) *Plugging the vagina*.—This is the method to be adopted in certain cases of accidental hæmorrhage. It has the same effect as method (1) has in cases of placenta prævia, *i. e.* it induces labour and checks hæmorrhage. It has been discussed in full (*v.* page 196).

(3) *Catheterisation of the uterus*.—This is Krauze's method of inducing labour, and is perhaps the best method to adopt in cases of contracted pelvis. It is a very simple operation to perform but is not free from risk, as it seems to be especially easy to infect the patient with sepsis whilst performing it. It is only under the most scrupulous aseptic precautions that it can be considered safe. To perform it, the patient is placed upon her back, in the cross-bed position, under an anæsthetic or not, as is thought best; the parts are shaved and thoroughly washed, and the vagina well douched. The cervix is then exposed by passing a posterior speculum, in order to prevent the bougies coming into contact with the vaginal wall, and the anterior lip is seized and drawn down by a bullet forceps. Two, three, or even four flexible gum elastic bougies are then passed, one by one, upwards between the membranes and the uterine wall, as far as they will go. They should be passed in very gently and allowed to take their own direction. If they meet with any resistance, withdraw them, and pass them again in another direction. The ends of the bougies which protrude are then wrapped round with iodoform gauze, in order to protect the vagina. Labour may ensue in

a few hours, or may not ensue for a few days. The bougies are taken out when the patient gets into strong labour, or when they have been in without result for twenty-four hours. In the latter case, after douching the vagina, a fresh set are passed in. If two or three sets have been passed without result, the os should be dilated by means of Barnes' bags; labour will then almost certainly ensue. If, as may happen in very rare cases, labour even then does not come on, podalic bi-polar version should be performed. The bougies used must be carefully sterilised. This is best done by boiling them for ten minutes, and then letting them lie for at least three hours in corrosive sublimate solution (1 in 500).

(4) *Intra-uterine injections*.—Injections of water or other fluid—Cohen's method—brings on labour by separating the membranes from the uterine wall. Cases of sudden death have occurred during its use, which have been referred to shock, to air getting into the uterine sinuses, or to rupture of the uterus (Lusk).

Intra-uterine injection of a small quantity of glycerine—Pelzer's method—is more deserving of attention. Half an ounce of glycerine is injected slowly between the membranes and the uterine wall. It is said to be a very certain and rapid method, but also to be dangerous, as it tends to set up nephritis and to cause a disintegration of the red blood-corpuscles. Pelzer claims that it acts:—

(a) By mechanical separation of the membranes.
(b) By direct stimulation of the muscle-fibres of the uterus.

(c) Owing to its hygroscopic properties, by

drawing liquor amnii through the membranes and thus rendering them flaccid.

A few years ago Kossmann recommended and successfully practised the injection of 5 c.c. (85 minims) of glycerine into the cervical canal. He states that accidents are caused by using large quantities for hygroscopic purposes, while small quantities used with the object of stimulating muscle-fibre, as in the rectum, are perfectly safe.

(5) *Dilatation of the cervix*.—This is best practised in conjunction with Krause's method, if necessary. It can be performed digitally, or by means of Barnes' or Champetier de Ribes' hydrostatic dilators. Digital dilatation is very liable to tear the cervix, and is not to be recommended. Dilatation at all is very rarely necessary, and if it has to be performed it is best done by means of the dilators mentioned. Champetier's are probably the best form to use, as their action more nearly resembles that of the unruptured membranes.

(6) *Rupture of the membranes*.—This—Scheele's method—is the most simple method of inducing labour. The latter, however,—thus induced—may not ensue for some days, and before it occurs an elevation of temperature due to intra-uterine decomposition may necessitate further treatment. If this happens, such treatment will not be so easily carried out as if the membranes were intact. Also the dilating action of the membranes is lost, and so labour thus induced is very tedious. It may be the best method to adopt in cases of hydramnios, as it will at once relieve the cardiac symptoms due to the pressure of the large uterus.

(7) *Electricity* is said to be of use, but is seldom attainable.

(8) *Vaginal douching*—Kiwisch's method—*i. e.* the forcible injection of a stream of warm water against the cervix for ten to fifteen minutes at the time, and at the rate of three or four such injections in the twenty-four hours, until labour comes on, is practically never used. Numerous cases of death from air being forced into the cervix, and so between the membranes and the uterine wall, have been reported.

(9) *Ecbolics* are useless, unless administered in dangerous doses.

(10) *Cupping the breasts* is also useless.

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CHAPTER XXVI.

THE FORCEPS.

Varieties of Forceps—Neville's Axis Traction Forceps—Methods of using the Forceps—Conditions—Indications—Method of Application—The Forceps in Occipito-posterior Positions of the Vertex, in Face Presentations, in Brow Presentations, in Breech Presentations.

THE term "forceps," as used in midwifery, means an instrument adapted for seizing and extracting the head of the child.

Varieties.—There are two chief varieties;—(1) the short forceps, (2) the long forceps. The short forceps has only a single curve corresponding to the curve of the child's head; it is intended for extracting the latter when it lies low down in the pelvis. It is not suitable in any other case. As the long forceps will deliver the head in any position, the short forceps has been given up, as being a needless addition to the obstetric armamentarium. The long forceps consists of two blades, an upper and a lower, each blade possessing two distinct curves,—a cephalic curve which enables it to be adapted to the child's head, and a pelvic curve which enables it to be adapted to the curve of the pelvis. It is often a difficult matter for beginners to determine which is the upper, and which the lower, blade. To do so, imagine your patient in front of you lying on her

left side. Then hold the blade in your hand, in such a position that its pelvic curve corresponds with the pelvic curve of the mother. If the concavity of the cephalic curve is then directed upwards, it must be the lower blade, as otherwise it could not be adapted to the foetal head; if downwards, it must be the upper blade, for the same reason.

There are many patterns of long forceps, both plain and with an axis-traction apparatus. By an axis-traction forceps, we mean one that is so adjusted, that, by pulling in the direction shown by an indicator or by the position of the handles, we are always pulling the head downwards in the axis of the pelvis. Every one prefers the pattern of forceps to which he is accustomed; but to any one who is buying his first forceps, I strongly recommend that known as Neville's (*v.* Fig. 47). It consists of Barnes' long forceps with Neville's axis-traction apparatus adjusted to it. The great advantage of this instrument is that the traction apparatus is entirely outside the vagina, when the forceps is applied; that it is absolutely uncomplicated; that it is a true axis-tractor; and that the forceps can be used with or without the traction apparatus as desired. In choosing one of these forceps the points that should be observed are:—

- (1) That the arrow-head indicator is parallel to the fenestrated portion of the blades.

- (2) That the forceps is not too flexible.

- (3) That the portion of the blade which comes in contact with the child's head is flat, or even very slightly concave, never convex as it is often made.

The forceps should be used as a tractor pure and simple. It is useless to use it as a compressor in order to diminish the diameter of the child's head. It seizes the head in the transverse diameter of the

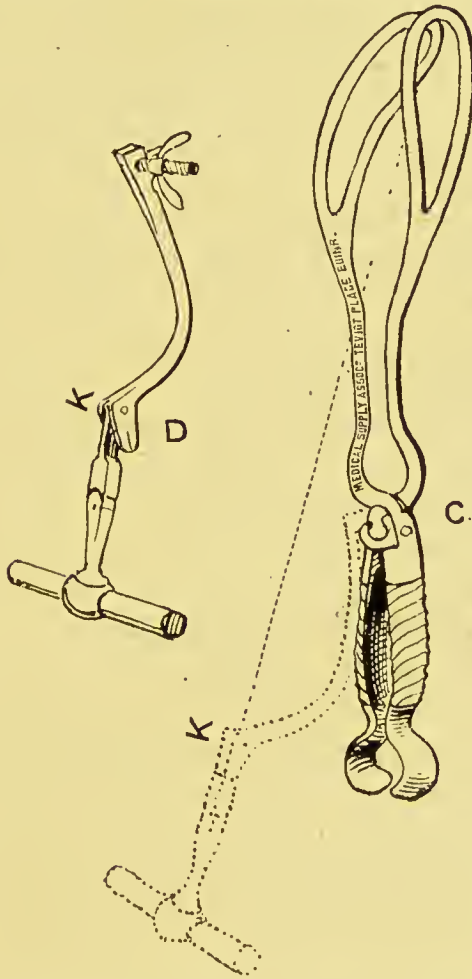


FIG. 47.—Neville's axis-traction forceps.

pelvis, approximately ; and, if it is made to compress the head, it causes a compensatory increase in that diameter of the latter which lies in the conjugate diameter of the pelvis, *i. e.* in the diameter

which most requires reduction. This is especially the case when the head is above the brim, as it is then impossible to avoid compression. It is one of the reasons for avoiding the so-called "high forceps" operation. The forceps also should not be used as a lever, *i. e.* by giving oscillating movements to the handles; as, by so doing, the mother's soft parts are made the fulcrum, and considerable harm may be done.

Conditions.—As a general rule, before the forceps ought to be applied four conditions should be fulfilled:—

(1) The greatest diameter of the head should have passed the brim.

(2) The os should be sufficiently dilated to allow the head to pass through, without any risk of causing laceration of the cervix.

(3) The membranes must be ruptured, and retracted over the presenting part.

(4) The bladder must be empty.

Let us discuss these points.

(1) *The greatest diameter of the head, &c.* The forceps is an unsuitable instrument for moulding the head. It tends to elongate the diameters which require diminishing; and thus more force is required for delivery than would be necessary if the head was suitably moulded. As a matter of fact, nature will mould a head through a pelvis through which it could not be extracted by the forceps. Even if the head is extracted, the extra force which must be employed is a direct source of danger to both mother and child. There are two classes of cases in which this law may have to be broken:—

(a) When the failure of the head to pass the brim is solely due to uterine inertia, and even then only in those cases in which suitable treatment has failed to provoke sufficient contractions, and in which we consider that the danger of waiting is greater than the danger of extraction.

(b) When the condition of the mother furnishes an absolute indication for *immediate* delivery, and when if the forceps fails we are prepared to perforate.

(2) *The os must be dilated, &c.* It is scarcely ever necessary to extract a head through an incompletely dilated os. If it is done, laceration is almost certain to result, and we are never sure how far a laceration once started may extend. Even if no harm is done in the immediate present, it leads in the near future to all the trouble and ill-health attending lacerated cervix and ectropion of the cervical canal. If we must deliver by the forceps when the os is only semi-dilated, as may be necessary in rare cases of prolapse of the cord, the cervix should be incised bilaterally, and thus laceration avoided.

(3) *The membranes must be ruptured, &c.* If the membranes are not ruptured, they are included between the forceps and the child's head; and, while we are extracting the head, we are also detaching the placenta. This accident may result in severe post-partum hæmorrhage, and in the death of the child.

(4) *The bladder must be emptied.* The distended bladder may possibly take up a certain amount of room in the pelvic cavity, and so compel more force to be used for extraction. As a rule, however, the

bladder is emptied in order to enable us to manage the third stage satisfactorily.

Indications.—The indications for the use of the forceps may be classified as :—

- (I) Indications on behalf of the child.
 - (II) Indications on behalf of the mother.
- I. In the first group are included :—
- (1) Fœtal heart-rate rising progressively above 160 in the interval between the pains, or falling below 120.
 - (2) Tumultuous movements on the part of the fœtus.
 - (3) The coming away of meconium, unmixed with liquor amnii, in a head presentation.
 - (4) Prolapse of the cord (*v.* page 342).
- II. In the second group are included—
- (1) Accidental hæmorrhage (*v.* page 198) and placenta prævia (*v.* page 202).
 - (2) Threatened rupture of the uterus (*v.* page 286).
 - (3) Prolonged second stage, *i. e.* lasting more than four hours.
 - (4) Convulsions (*v.* page 232).
 - (5) Cardiac, pulmonary, or renal disease.
 - (6) Hæmatoma of the vulva (*v.* page 278).

There are two classes of cases which are frequently added to the above list, and which I should like to warn against :—

- (1) Secondary uterine inertia. The application of the forceps is to be avoided unless all means of promoting contraction has failed, because of the danger of post-partum hæmorrhage (*v.* page 219).
- (2) Contracted pelvis, with the head above the

brim. The application of the forceps is to be avoided, because it is not a suitable instrument for moulding the head (*v.* page 255).

I do not mean by this that the forceps is never to be used in these cases; it may be necessary to apply it. I mean that it is only to be used, as I have said before, when the condition of the mother furnishes an *absolute* indication for immediate delivery, and when, if it fails, we are prepared to perforate, and is not to be applied for a relative indication such as that the mother has been more than four hours in the second stage.

Method of Application.—The forceps may be applied with the patient on her side, or on her back. The former position is to be preferred, as it is easier to observe the progress of the case, the perinæum can be better protected, and only one assistant is required. If the case requires considerable force to be used, then the patient may be turned on her back, as more power can be obtained when she is in this position.

With the patient on her left side, the forceps is applied as follows:—Place the patient fully under an anæsthetic, wash thoroughly the external genitals, pass a catheter, and douche out the vagina. Then take the lower blade in the right hand, using soap as a lubricant (*v.* page 4). Pass as much of the left hand as necessary into the vagina, posterior to the head, and in the direction of the left or the right sacro-iliac joint according as the lower or upper blade is being introduced. If the cervix can be felt, slip the fingers between it and the child's head. If it cannot be felt, it is retracted and ob-

literated, and, therefore, there is no fear of including it between the forceps and the child's head. Enter the blade at right angles to the symphysis, and then pass it upwards along the palm of the left hand, carrying the handle at the same time towards the mother's right thigh and finally bringing it back into the middle line. Use little or no force, but allow the blade to take its own direction. If it catches in anything withdraw it slightly, and then pass it up again. Above all, remember to which side you want the blade to go; and that when it is there, the handle will lie at the opposite side. When the lower blade is in position, pass the other in the same manner, with the exception that the handle is carried towards the left thigh. Then lock the blades. If there is any difficulty in doing so, do not force them to lock, but withdraw one and pass it again. If the blades absolutely refuse to lock, it is probably not a case for the forceps. The administration of chloroform may usually be stopped as soon as the blades are locked. Having adjusted the traction apparatus, apply traction in the direction shown by the indicator, *i. e.* keeping the arrow-head in the centre of the opposing surface. Pull intermittently, and during the uterine contractions, if there are any. As soon as the head reaches the perinæum, allow it to dilate the latter for a moment, then to recede, and repeat this manœuvre several times before extracting; as, by so doing, the perinæum is more perfectly dilated. Deliver the head as has been previously described under normal labour (*v.* page 80), taking off the blades before it is born, or not, as is preferred. Anæsthesia should be over

by the time the head is born. The rest of the extraction calls for no further remarks.

If the forceps is applied when the patient is in the dorsal position, the only difference is in the fact that the lower blade is passed with the left hand, the right hand being in the vagina.

If Tarnier's or Milne Murray's forceps is used, we must apply traction in such a manner that the rods of the traction apparatus are always close to the handles of the forceps. If a forceps without any axis-traction adjustment be used, we must pull so as to suit the curve of the parturient canal. That is, if the head is at the brim, first, downwards and backwards; then downwards; then downwards and forwards; and finally, almost straight forwards.

Extraction by the forceps in *occipito-posterior positions* of the vertex is always more difficult, and requires the exertion of more force than is necessary in a normal position of the head; it should be avoided if possible, as severe lacerations of the soft parts are likely to occur. During extraction the head may rotate, so that the occiput comes to lie beneath the pubes. If this happens the forceps must be removed and reapplied. If the occipito-posterior position persists, the forceps must be carried well forward over the mother's abdomen until the occiput is born, and then in the opposite direction as the face slips from behind the perinæum. The latter is very frequently torn in these cases.

In *face presentations* the forceps is of little use, except in those cases in which the non-delivery of the child is due solely to uterine inertia. It may also be tried as a *dernier ressort* before performing

perforation when there is an absolute indication for delivery on the part of the mother, if the child is alive and if the chin has not rotated posteriorly. If it is applied whilst the long diameter of the face lies in the transverse diameter of the pelvis, it will in all probability slip. If it does not slip, the pressure of the blades on the neck of the child will probably kill it. After rotation of the chin has occurred, the head is so nearly born that the forceps is usually unnecessary (*v.* page 118).

In *brow presentations* the forceps is contra-indicated. The brow is much more likely to become corrected, into a face or vertex, if delivered by uterine contractions alone, than if the forceps is applied (*v.* page 121). The forceps, however, may have to be used under the same conditions as in a face presentation, and if the brow has rotated in front.

In *breech presentations* the forceps is liable to slip, and also to harm the child. It is better to extract an impacted breech by other means (*v.* page 317).

CHAPTER XXVII.

VERSION—ARRESTED BREECH—IMPACTED SHOULDERS.

Version: Varieties—Cephalic Version: Indications, Methods, External Version, Bipolar Version—Podalic Version: Indications, Methods, External Version, Bipolar Version, Internal Version—Contra-indications to Version—Arrested Breech: Diagnosis, Treatment—Impacted Shoulders: Treatment.

VERSION.

VERSION is the term applied to the operation by which the presentation of the child is changed. There are two varieties of version, named after the resultant presentations:—

- (I) Cephalic version.
- (II) Podalic version.

Cephalic Version.—The operation of cephalic version consists in changing the original presentation of the child into a head presentation.

Indications.—Cephalic version is indicated in faulty presentations of the child, if the following conditions are fulfilled:—

- (1) If rapid delivery is not required.
- (2) If there is nothing to prevent the child's head engaging in the pelvis.
- (3) If the presenting part is not fixed.

Methods.—It can be performed by—

- (1) External manipulation, Wigand's method, or
- (2) By combined external and internal manipulation, Braxton Hicks's method.

(1) To perform external cephalic version we require a lax abdominal wall and unruptured membranes. If the patient strains she must be placed under an anæsthetic. As soon as the abdominal walls are lax, ascertain by palpation the exact position of the fœtus; and, by a series of pushing movements, press the head in whatever direction will bring it over the pelvis by the shortest route, at the same time, pressing the breech in the opposite direction. Then, if the os is nearly dilated, rupture the membranes; and either hold the head over the brim until the uterine contractions cause it to fix, or—which will have the same effect—apply a binder tightly round the patient's abdomen. It is not much use to turn the fœtus before labour has commenced, as it would probably slip back into its original position.

(2) Cephalic version by the combined method of Braxton Hicks may be performed before or soon after the membranes have ruptured. To perform it introduce as much of the hand into the vagina as is necessary, and push the presenting part upwards out of the brim, and towards the opposite side from that at which the head is lying. If the head lies towards the right side of the patient, use the left hand, and *vice versâ*. Then, with the other hand on the abdominal wall, press the head down, and ensure its remaining there by the same means as in external version.

Podalic Version.—This is an operation which is far more frequently required than cephalic version. It consists in changing the original presentation of the child into some variety of pelvic presentation,

and most frequently into a footling presentation, by drawing down a foot.

Indications.—Podalic version is indicated:—

(1) In certain cases of malpresentation of the head, *i. e.* face and brow presentations (*v.* page 117 and 122), and in posterior parietal presentations.

(2) In certain cases of prolapse of the cord (*v.* page 342).

(3) In most cases of placenta prævia (*v.* page 201).

(4) In certain cases of contracted pelvis (*v.* page 254).

(5) In cross-births, in which cephalic version has either failed, or cannot be performed (*v.* page 125).

Methods.—Podalic version can be performed by:—

(1) External manipulations only, if it is not necessary to bring down a foot.

(2) Combined internal and external manipulations.

(3) Internal manipulations.

(1) External podalic version can be performed under the same conditions as cephalic version, —namely, lax abdominal walls, the presenting part unfixed, and unruptured membranes. It is performed in exactly the same manner as cephalic version, except that the breech, instead of the head, is brought over the pelvic brim.

(2) Combined, or bipolar version, is principally indicated in the case of placenta prævia. To perform it we require lax abdominal walls, unruptured membranes, the presenting part not fixed, and an os which is sufficiently dilated to admit at least two fingers. An anæsthetic is almost always necessary, as the

danger of prolapse of the cord is very great if the patient strains. Place the patient in the cross-bed position, ascertain by palpation the exact position of the child, and then turn the child by external ver-

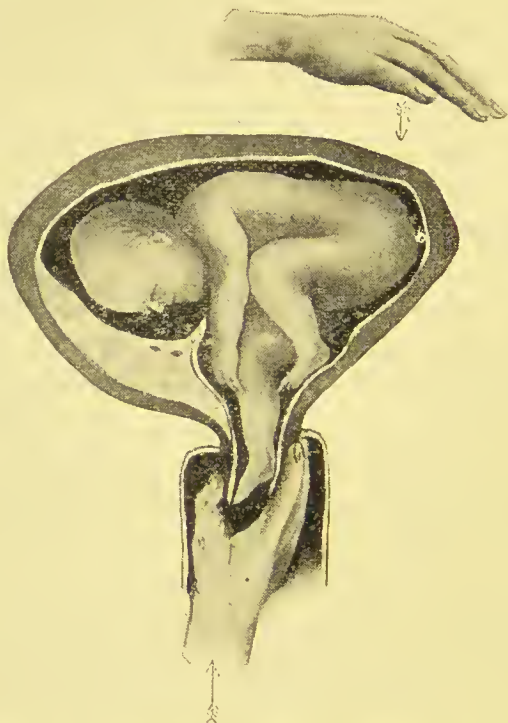


FIG. 48.—Method of completing bipolar version in a case in which the size of the os will not permit of the presence of the foot and the two fingers at the same time. The hand in the vagina pushes the cervix upwards while the foot is made to descend by pressure upon the breech (diagrammatic).

sion into a transverse presentation. The child must be turned in such a direction that its back will be towards the fundus uteri, and its abdomen facing the pelvic brim. If this is done, the foot will be found lying in the neighbourhood of the internal os.

Then introduce the whole hand into the vagina and two fingers into the cervix, rupture the membranes, and with the hand on the abdomen press the breech downwards; the foot can then be seized and brought out into the vagina. This is easily accomplished if the os is fairly well dilated. In some cases, however, the os may be quite large enough to admit two fingers, or to allow the foot to descend by itself, but it may not be large enough to allow all three to pass through it at the same time. If this is so, proceed as follows:—Having seized the foot with the fingers in the uterus, draw it down until the toes are through the os internum. Then withdraw the fingers into the vagina, and attempt to push the cervix upwards over the foot. At the same time press upon the breech through the abdominal wall, so as to cause the foot to descend (*v.* Fig. 48). When half the foot has by this means been brought into the vagina, seize it and draw it downwards. Lastly, with the abdominal hand push the head up to the fundus.

(3) Internal podalic version, which is in reality also “combined version,” can be performed—

(A) If the os is sufficiently dilated to admit the entire hand into the uterus.

(B) If the presenting part is not too firmly fixed to be displaced.

(C) If no contra-indication to version exists.

It is most frequently required in cases of neglected shoulder presentation. It can best be performed with the patient upon her back. Commence by ascertaining the exact position of the child by palpation, then empty the bladder, and wash the

patient. In a transverse presentation, if the legs are on the right side of the mother, use the right hand, and *vice versâ*. In a vertex presentation, the right hand is to be preferred for every position of the child, except when its limbs are to the right and in front; then the left hand is more suitable.



FIG. 49.—Method of completing a difficult case of internal version, by means of a gauze fillet (diagrammatic).

If the operation has to be performed with the patient upon her side, place her upon the side at which the limbs are, whatever the presentation of the foetus, and use the opposite hand.

Having introduced the proper hand, seize the first foot that can be felt, and draw it downwards

and towards the opposite side of the pelvis. The child is now lying with both head and breech in the lower part of the uterus. The last step of the operation consists in pushing the head up into the fundus, while at the same time we draw the foot down deeper into the vagina. This may be very easy, or it may be extremely difficult, or even impossible, according to the degree of force with which the uterus has contracted down upon the child. If the head cannot be made to rise to the fundus, as I have described, bring down the other foot and apply traction to both feet. If this is still unavailing, a simple and most successful expedient is as follows:—Make a slip-knot on a strip of iodoform gauze, sufficiently long to extend outside the vulva, and pass it upwards round the ankle of one or both feet. Seize the strip with one hand outside the vagina, and pull upon it; while, at the same time, the other hand in the vagina pushes the head upwards out of the pelvis (*v.* Fig. 49). If this fails, embryotomy in some form will be necessary, as the child cannot be delivered in its present position.

If an arm is prolapsed into the vagina, it is well to slip a noose of gauze over it in order to prevent its becoming extended during the subsequent delivery: beyond this, pay no attention to it at first, but draw down the foot as directed. The arm will be found to slip up out of the vagina as the head ascends to the fundus.

It will be seen that internal version is also “combined,” in that the process is performed by the use of both hands, one inside the uterus, the other on the abdominal walls. The real difference between

“combined version,” so called, and internal version is that in the former only two fingers are introduced into the uterus, in the latter the whole hand.

Difficulties in the performance of internal version may be caused by—(1) not having ascertained the exact position of the child at the commencement; (2) passing the hand outside the membranes instead of inside.

Contra-indications.—Version is contra-indicated by the presence of certain conditions:—

(1) If the contractions of the uterus have been so strong that the fœtus is in great part expelled from its cavity. In order to turn, the expelled portion of the fœtus would have to be replaced in the uterus, and there is not room for this.

(2) If it is obvious that the child cannot be delivered without embryotomy or craniotomy, even after version. Perforation of the after-coming head is a more difficult operation than perforation of the head coming first, especially in the case of a contracted pelvis.

(3) If the membranes are long ruptured, and the contraction ring is more than $2\frac{1}{2}$ inches above the symphysis (Winckel). In this case rupture of the uterus would most probably result.

ARRESTED BREECH.

By the term arrested breech, we mean the condition that occurs when a breech presentation—

(1) Cannot enter the pelvic brim.

(2) Is driven down into the pelvis but cannot advance.

This condition is usually due to an exceptionally large breech or a contracted pelvis, or to the failure of a normally sized breech to rotate.

Diagnosis.—An arrested breech is diagnosed when the breech remains above the brim or in the pelvis, and makes no progress, although the pains are strong.

Treatment.—If the breech is delayed at the brim, and pressure upon the fundus during the pains fails to make it advance, bring down a leg. To do so place the patient in the cross-bed position, and introduce the entire hand into the vagina, and slip two fingers upwards into the uterus along the anterior thigh. If the child is lying with its knees flexed, the foot will be found near the buttock, and can be seized and drawn down. If, on the other hand, the knees are extended, slip the fingers still further down the thigh, until the knee is reached; and then, by pressure upon the anterior aspect of the leg just below the knee, the leg is made to flex upon the thigh, and so brought down. If the leg is got down, it diminishes the size of the presenting part, and gives a means by which to apply traction. We must take special care to get below the knee before endeavouring to flex the leg, otherwise there is great danger of fracturing the femur.

If the leg cannot be brought down owing to the breech having become impacted in the pelvic cavity, we must resort to traction upon the groin. With the patient in the same position, slip two fingers into the angle of the anterior groin one above the other, and apply traction in the pelvic axis, at the same time trying to assist anterior rotation. By this

means the breech is brought sufficiently low to enable us to pass the fingers into the posterior groin; so, by pulling alternately on one and the other, the child is extracted. The strength of the fingers, which are used to make traction on the groin, can be greatly increased by grasping the wrist firmly, during the traction, with the other hand.

If the impacted breech still resists our efforts, endeavour to pass a fillet of iodoform gauze over the anterior groin. There are several instruments for accomplishing this, but an ordinary No. 10 or No. 12 gum-elastic catheter, with a stilette, will answer every purpose. Thread the catheter with a piece of boiled silk or twine, and then pass in the stilette. Bend the top of the catheter so as to form about one third of the circumference of a circle similar in size to the girth of the child's thigh. Then slip the catheter upwards, along the anterior vaginal wall, until the end of it can be turned inwards over the groin. Now, holding the instrument by the ring of the stilette, push the catheter itself upwards. The curve which has been given to the stilette will direct the catheter so that the point comes down between the thighs. The end of the twine with which it is threaded is then seized, and the catheter withdrawn. Lastly, a piece of iodoform gauze is tied to the twine, and, by means of it, drawn over the groin. This furnishes a soft but strong fillet, with which the breech can be drawn down. Traction should always be made in the axis of the pelvis, and care be taken that the fillet comes well down into the angle of the

groin, and does not lie against the femur, as fracture would then be very likely to occur.

If the child is dead, and extraction difficult, a cephalotribe may be applied to the breech; or, if one is not to hand, the forceps tightly screwed up may be used instead. A blunt hook is a most dangerous instrument for extraction. Even in skilled hands it may break the femur of the child, or tear the femoral vessels; whilst in unskilful hands much damage may be done to the mother's soft parts. As soon as the breech of the child has passed the vulva, the case is managed in the same manner as an ordinary breech presentation.

IMPACTED SHOULDERS.

Impacted shoulders occur sometimes after the birth of the head. The shoulders become firmly lodged in the pelvis, either owing to their size or to their failure to rotate.

Treatment.—If the shoulders do not rapidly follow the head, firm pressure should be made upon the fundus. If they still do not advance, pass one hand into the vagina, and endeavour to get a finger into the posterior axilla; draw it down, and then in the same way pull upon the anterior axilla. If this fails, endeavour to bring down one or both arms. To do this, pass the whole hand into the vagina, and a couple of fingers upwards, along the posterior arm, until the elbow is reached. Then, by gentle pressure below the elbow, the forearm is made to flex, and the hand can be seized and drawn out. The anterior arm is then brought down in the same

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manner. By this means the width of the chest is diminished by twice the thickness of either shoulder. Traction can now be made upon both arms, and upon the head. If, in spite of this, the thorax does not follow, the hand should be introduced as far up as necessary, in order to determine if there is any pathological enlargement of the thorax or abdomen. If such a condition is present, it may be necessary to perform evisceration.

CHAPTER XXVIII.

CRANIOTOMY AND EMBRYOTOMY.

Craniotomy: Indications, Instruments, Conditions—Method: Perforation, Evacuation, Compression, Extraction—Perforation in the Case of a Face Presentation—In the Case of an After-coming Head—Embryotomy: Decapitation, Indications, Instrument, Method—Evisceration, Indications, Instrument, Method.

CRANIOTOMY.

By the term craniotomy is meant any cutting operation performed upon the head of the foetus, with the object of reducing its bulk.

Indications.—As craniotomy of necessity implies the death of the child, it must only be performed under conditions of absolute necessity on the living child. The indications for the operation are as follow (Winckel):—

(1) If the child is dead, and if extraction of the undiminished head would be dangerous for the mother.

(2) If the child, in all probability, could not be extracted alive, and if such extraction would be dangerous for the mother.

(3) If the child is alive, and a relative indication for Cæsarean section or symphysiotomy exists (*v.* pp. 331, 335), but the mother refuses the operation.

Instruments.—The instruments which are required,

and which are best adapted for craniotomy, are :— a Simpson's perforator; a Winter's modification of Auvard's combined cranioclast and cephalotribe (v. Fig. 50); and a large-size Bozemann's catheter.

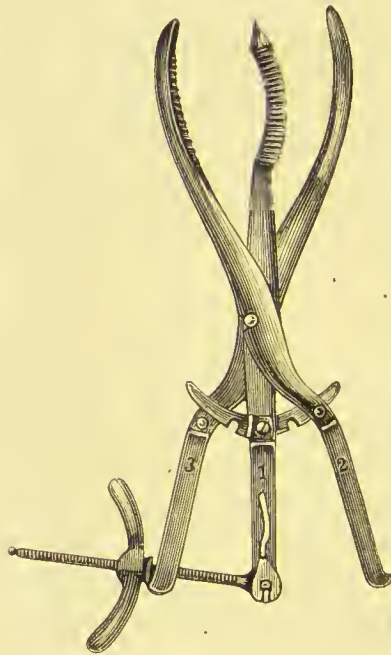


FIG. 50.—Winter's modification of Auvard's combined cranioclast and cephalotribe.

Conditions.—Certain conditions are necessary before the operation can be performed :—

(1) The pelvis must not measure less than two inches in the *conjugata vera*. Extraction of even a perforated head, through a pelvis which is smaller than this, is so dangerous that it should not be attempted.

(2) The os must be sufficiently dilated to permit the necessary manipulations.

(3) The head must be fixed, or be held fixed by an assistant.

Method.—The operation consists of four steps :—

(1) Perforation.

(2) Evacuation.

(3) Compression.

(4) Extraction.

Place the patient—previously anæsthetised—in the cross-bed position. Palpate the case carefully, and disinfect the parts thoroughly in the usual manner.

(1) *Perforation.*—Introduce as much of the hand as is necessary into the vagina, pass two fingers inside the os, and touch the presenting part. Slip the locked perforator upwards, under guard of the hand, and press it firmly and steadily through the centre of the presenting part, be it bone or suture. If this is done, and if the pressure is made perpendicularly to the surface against which it is applied, there is less risk of the slipping of the instrument. Then release the catch which locks the perforator, and press the handles together; this separates the blades, so making a longitudinal cut in the calvarium. Withdraw the instrument partially, turn it round through a right angle, and push it up again. Open the blades again, so making another cut at right angles to the former one.

(2) *Evacuation.*—Push the instrument, through the opening thus made, down to the base of the skull, and, moving it about, break up the brain thoroughly. Commence with the medulla oblongata

in order to ensure the death of the child. Next introduce the Bozemann's catheter, and douche out the fragments of the brain. If this latter has been first thoroughly broken up it will be washed out with ease and rapidity.

(3) *Compression*.—Now take the combined cranioclast and cephalotribe. It consists of three blades:—a central or male blade, which resembles the male blade of an ordinary Braun's cranioclast; and two outside blades, both of which lock into the central blade. One of these outer blades locks with the central blade so as to form a cranioclast, the other blade completes the cephalotribe. The instrument is also furnished with a strong screw, which can be adjusted so as to compress either external blade against the central blade. To use it, introduce the central blade into the interior of the cranium, and then pass one of the external blades upwards, in such a manner that it lies over the face of the child (*v.* Fig. 51). Take care that the central blade is so turned that its convexity points towards the external blade, as otherwise it would not have so firm a grip upon the head. We have now a cranioclast upon the child's head, and, if the obstruction is not too great, the head can be delivered by it without using the other blade. A cranioclast acts by elongating the evacuated head, and so reducing all its diameters except the vertical.

In some cases it may be necessary to reduce the size of the head still further, and this can be accomplished by the aid of the third blade.

Having applied the cranioclast over the face of the child, and tightened the screw until the catch

can be fastened, introduce the third blade, so that it lies at the opposite side of the head to the cranioclast (*v.* Fig. 52). Lock it, and apply the screw to it. Then tighten the screw until the handles come sufficiently close to enable the catch which



FIG. 51.—First step in the application of the combined cranioclast and cephalotribe (modified from Dührssen).

holds the second blade to be fastened (*v.* Fig. 53). Always endeavour to pass the blades as far down over the base of the skull as possible.

The great advantage which Auvard's instrument possesses is, that the head can be crushed without

any fear of the cephalotribe slipping, as it is held firm by the previously applied cranioclast.

(4) *Extraction*.—Perforation should always be followed by extraction. In many cases the contractions of the uterus would expel the perforated



FIG. 52.—Second step in the application of the combined cranioclast and cephalotribe (modified from Dührssen).

head without assistance after a little time, but it is not wise to allow this to occur. In the first place, decomposition proceeds very rapidly inside a perforated head, and the patient may thus become infected. In the next place, she has probably been

allowed to remain undelivered as long as is safe, and therefore the uterus must now be emptied. Extraction is performed by means of the cranioclast or the combined instrument. In performing it, the head should be made to rotate in such a manner as



FIG. 53.—Final step in the application of the combined cranioclast and cephalotribe (modified from Dührssen).

to imitate, as nearly as possible, the normal mechanism of labour.

In the case of a *face presentation*, endeavour to introduce the perforator through one of the orbits, and, failing that, through the roof of the mouth.

In the case of the *after-coming head* the operation of perforation is sometimes difficult. Choice may be made between two sites for the introduction of the perforator. It may be introduced either into one of the lateral fontanelles, or into the occipital bone (Dührssen). If the former site is chosen, draw the body of the child forwards, and to one side; by this means the latter fontanelle is made to descend. If the latter site is chosen, draw the body forcibly backwards, introduce the fingers of the left hand between the symphysis and the occiput of the child, and perforate at the highest point which is protected by the fingers (Dührssen).

EMBRYOTOMY.

Embryotomy is the term applied to any operation intended to reduce the size or shape of the child's body. It includes decapitation and evisceration.

Decapitation.—By decapitation is meant the separation of the child's head from the body at the neck.

Indications.—It is indicated in cases of neglected shoulder presentation, when version is either impossible or is contra-indicated, and in which the neck can be reached; also in cases of locked twins when the after-coming head of the first has become interlocked with the forecoming head of the second.

Instrument.—In neglected shoulder presentations the best instrument for the purpose is Braun's blunt hook (*v.* Fig. 54). It performs the operation with ease, and with a minimum of danger for the mother.

Method.—Place the patient, fully anæsthetised, in the cross-bed position. Introduce one hand into

the vagina, and endeavour to encircle the neck from behind with the fingers. Then pass the hook, under cover of the hand, upwards along the back of the child's neck; turn it, so that it lies over the neck of the child; and finally, by a series of twisting movements, fracture the spinal column. Then draw down the arms, and extract the trunk by traction upon them.

The head is extracted last, and may cause some trouble. The easiest method of extracting it is to pass the hand into the uterus, and two fingers into

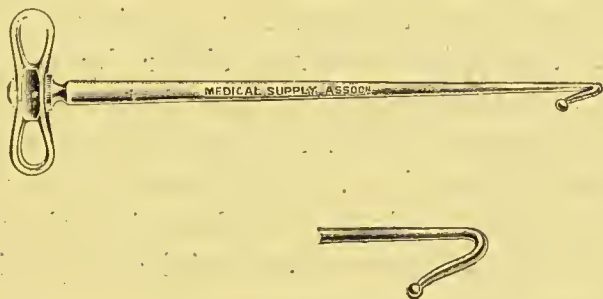


FIG. 54.—Braun's blunt hook for decapitation.

the mouth, and in this way to draw the head downwards, whilst an assistant at the same time applies pressure to the fundus. It may be necessary to perforate and crush the head if the pelvis is contracted.

Evisceration.—Evisceration consists in making an opening into the thorax or abdomen of the child, and through it removing some of the viscera.

Indications.—It is indicated if the size of the child's body obstructs delivery, or if the neck cannot be reached, in order to perform decapitation, in the case of a neglected shoulder presentation.

Instrument.—A Simpson's perforator, with which to make the necessary opening, is all that is required. A pair of sharp-pointed scissors will answer equally well.

Method.—The patient must be in the cross-bed position as before. Introduce the perforator into whatever portion of the trunk can be most easily reached. Make an opening sufficiently large to allow the hand or the fingers, according as is necessary, to be introduced. Seize any of the larger viscera that present, and tear them away. In this manner the liver, lungs, and heart may be removed. When the size of the trunk is sufficiently reduced, fracture the spinal column, either by cutting it or with a Braun's blunt hook, and then extract the child in the same manner as occurs in spontaneous evolution (*v.* page 124). If there are no instruments at hand for doing this pass the hand into the uterus, seize the feet, and extract the child as a pelvic presentation.

CHAPTER XXIX.

CÆSAREAN SECTION—PORRO'S OPERATION—
SYMPHYSIOTOMY.

Cæsarean Section: Indications, Method — Porro's Operation :
Indications—Symphysiotomy: Indications, Operation, After-treatment, Dangers.

CÆSAREAN SECTION.

CÆSAREAN section is the term applied to the operation by which the abdomen of the mother is opened; the uterus incised; the child extracted through the opening thus made; the incision in the uterus stitched up; and the latter replaced in the abdomen. It thus differs from Porro's operation, in which, after the extraction of the child, the uterus is removed.

Indications.—The indications for Cæsarean section may be divided into two classes:—

A. *Absolute indications*,—in cases in which abdominal section is the only means by which the child can be delivered.

B. *Relative indications*,—in cases in which the child could also be delivered by some other operation, such as symphysiotomy, perforation, or induction of premature labour.

In the first class of cases Cæsarean section must be performed. In the second group, whether it is

adopted or not depends upon several circumstances:—the period of pregnancy, the condition of the child, and the will of the mother. The indications are:—

A. (1) Absolute pelvic contraction, *i. e.* below two inches in the conjugata vera.

(2) Solid irremovable tumours blocking the pelvis; as,—bony growths from the pelvic walls, myomata of the uterus, cancer of the cervix, or ovarian tumours.

(3) Extreme cicatrization of any part of the vagina, sufficient to prevent its being dilated without the rupture of other organs (Winckel).

B. (1) Lesser degrees of pelvic contraction, *i. e.* pelvis which measure from 2 to 3 inches in the conjugata vera, in the case of a living child; when it is impossible to induce premature labour or to perform version or symphysiotomy.

(2) Lesser degrees of obstruction from solid tumours as above, A (2), if the child is alive.

Method.—In a book of this nature, it is possible to give only a very short outline of the operation. It should be performed, if possible, after the patient has come into labour, but before the membranes have ruptured. There is then the least danger of post-partum hæmorrhage owing to the presence of uterine contraction; and the os will be sufficiently dilated to allow free escape of the lochia during the puerperium. For the performance of the operation, four assistants are advisable;—one to give the anæsthetic, one to take charge of the infant after its extraction, and two to assist the operator. The steps of the operation are as follow:—

(1) Open the abdomen in the middle line by means of an incision eight inches in length, one-third of which lies above the umbilicus, the remainder below; the uterus appears in the wound.

(2) Open the uterus in the centre of the presenting part by means of an incision six inches in length, the edges of the abdominal wound being kept firmly pressed against the uterus by an assistant. If the placenta lies under the wound it must be cut through.

(3) The child is rapidly extracted by the head if it can be easily reached, if not by both feet, the cord clamped and divided.

(4) The uterus is lifted out of the abdomen; and the assistant grasps the lower uterine segment tightly as far down as possible, in order to check hæmorrhage, while the operator passes a gauze towel round it.

(5) This towel is twisted tightly, and the assistant, letting go the uterus, holds the ends of it.

(6) The placenta, membranes, and blood-clots are removed from the uterus.

(7) The cervix is seen to be patulous, otherwise it must be dilated.

(8) The uterine incision is then stitched up by deep silk stitches. These travel the entire thickness of the uterine wall, with the exception of the mucosa, and are passed at intervals of a centimetre ($\frac{2}{5}$ inch), superficial stitches including the peritoneum and a little of the muscular coat may be inserted between the deep sutures if necessary.

(9) The peritoneal cavity is cleansed, the uterus is replaced, and the abdominal wound stitched up

by alternate deep and superficial silkworm-gut sutures.

The after-treatment of the case resembles that of any abdominal section. The abdominal sutures are removed on the eighth day; and, if all goes well, the patient is allowed out of bed at the end of three weeks. An abdominal binder must be worn for a year.

PORRO'S OPERATION.

Porro's operation differs from Cæsarean section in that the uterus is removed supra-vaginally after the extraction of the child.

Indications.—Porro's operation is indicated instead of Cæsarean section in the following cases:—

- (1) If the uterus is defectively developed.
- (2) If the uterus is the subject of some incurable disease, as cancer or myomata.
- (3) If the patient suffers from osteomalacia.
- (4) If we have reason to believe that the uterus has been infected with septic organisms during labour.
- (5) It is also indicated in bad cases of concealed accidental hæmorrhage (*v.* page 194).

The operation is the same as a supra-vaginal amputation of the uterus, with intra- or extra-peritoneal treatment of the stump. In some cases it may be better to perform pan-hysterectomy, and to remove the entire uterus.

SYMPHYSIOTOMY.

The operation of symphysiotomy consists in dividing the ligaments of the symphysis pubis,

and so allowing the separation of the innominate bones. As a result, all the diameters of the pelvis are increased.

Indications.—Symphysiotomy is indicated in contracted pelvis when the conjugate diameter measures from $2\frac{3}{4}$ to $3\frac{1}{2}$ inches (7—8.75 c.c.) in length, if the induction of premature labour is out of the question. By dividing the symphysis an average separation of the pubic bones of about $2\frac{3}{5}$ inches (6.5 c.m.) occurs, and this yields an increase in the conjugata vera of three-fifths of an inch (1.5 c.m.). Then if the head comes through the pelvis in such a manner that one parietal eminence bulges into the gap, an additional gain of two-fifths of an inch is obtained. Assuming the bi-parietal diameter of the foetal head to be $3\frac{3}{4}$ inches (9.5 c.m.), and that the average increase in the conjugata vera is one inch ($\frac{3}{5} + \frac{2}{5}$), it is plain that the minimum conjugata vera that permits of symphysiotomy is $2\frac{3}{4}$ inches.

As much as $3\frac{3}{5}$ inches (9 c.m.) separation of the pubic bones has been obtained with safety, yielding an increase in the conjugata vera of a little over $\frac{4}{5}$ inch (2 c.m.).

Operation.—Four assistants are required ;—one to assist the operator, one to give an anæsthetic, and two to control the separation of the innominate bones, which tend to spring suddenly apart the moment the symphysis is divided.

The end of the first stage is the best time for the operation. The steps of it are as follow:—

(1) An incision is made through the skin and subjacent tissues, starting about an inch and a half above the symphysis, and ending at the clitoris.

(2) An opening is made through the aponeurosis of the recti, sufficiently large to permit of the finger being passed behind the symphysis.

(3) The bladder and other retro-pubic structures are separated from the back of the symphysis, and from the pubic bones, for a distance of two inches at either side. This is a most important part of the operation, as it prevents laceration of the urethra, &c., when the bones separate.

(4) The pubic ligaments are divided, from behind forwards, and from above downwards, the assistants taking every precaution to prevent the bones from springing asunder suddenly.

(5) The child is extracted by the forceps or by version.

(6) A piece of iodoform gauze is placed behind the separated bones, in order to prevent any of the soft parts from becoming nipped between them, and the end of it is brought out through the most dependent part of the wound.

(7) The skin and subjacent parts are brought together by deep silk sutures, which go right down to the bone and include the periosteum. As they are tied, the assistants press the pelvic bones again into contact.

(8) The iodoform gauze is then removed by pulling upon the end which hangs outside, and superficial stitches are inserted wherever necessary.

(9) The wound is dressed in the usual manner, and a tight binder fastened round the pelvis in order to keep the bones in contact.

After-treatment.—The patient must lie upon her back on a hard bed for three weeks. The catheter

must be passed regularly, and the binder changed as often as it becomes soiled. The patient may usually be allowed out of bed in four weeks, but a pelvic binder must be worn for a year after the operation.

Dangers.—The dangers of the operation are :—

- (1) Rupture of the urethra and bladder.
- (2) Hæmorrhage from laceration about the clitoris.
- (3) Rupture of the sacro-iliac articulations.
- (4) Failure of the pubic joint to reunite.

CHAPTER XXX.

PROLAPSE OF THE CORD.

Difference between Presentation and Prolapse of the Cord—
Ætiology — Diagnosis — Treatment: Reposition, Version,
Forceps.

By the term presentation of the cord is meant that the cord lies in front of the presenting part, the membranes being unruptured. Prolapse of the cord is the term applied to the same condition after the membranes have ruptured.

Ætiology.—The commonest cause of presentation or prolapse of the cord may be stated generally to be any condition that interferes with the normal adaptation that exists between the presenting part and the lower uterine segment. The chief of these conditions are :—

- (1) Contracted pelvis.
- (2) Malpresentations:—face, breech, cross-birth, brow.
- (3) Hydramnios.
- (4) Twins.

In any of these conditions the presenting part may not fill the lower uterine segment. Consequently when the membranes rupture, the liquor amnii comes away with a rush, and may carry down

a loop of the cord with it. Prolapse may also occur owing to :—

- (5) Low attachment of the placenta, *i. e.* placenta prævia.
- (6) An abnormally long cord.
- (7) Marginal insertion of the cord into the placenta, *i. e.* battledore placenta.

Diagnosis.—The diagnosis is obvious in prolapse of the cord. A loop of it can be felt in the vagina, or may even be seen protruding from the vulva. In presentation of the cord, its coils are felt in front of the presenting part; and, if the child is alive, the cord pulsates.

Treatment.—There are three general lines of treatment, one of which must be adopted if the life of the child is to be saved :—

- (1) Reposition of the cord.
- (2) Substitution of a presentation which permits of the descent of the foetus without pressure on the cord : *i. e.* podalic version, with or without,
- (3) Immediate delivery of the foetus.

If the cord is not pulsating when the condition is discovered, and if the foetal heart cannot be heard, the child is dead, and there is no need to interfere. It must always be remembered that the cord stops pulsating at least a minute before the death of the child; consequently, if we know that the pulsations have only just ceased, we should deliver at once, if possible, and not give the case up as hopeless.

(1) *Reposition.*—The manner of performing reposition varies with the conditions present. If it is a case of presentation of the cord, and the presenting

part is not fixed, try the *postural treatment*. Place the patient in Trendelenberg's position, *i. e.* with the buttocks raised and the head low; the fœtus will then tend to fall towards the fundus under the influence of gravity, and the cord may do the same. Examine vaginally while the patient is still in the same position. If the cord has gone up, push the presenting part into the brim of the pelvis, rupture the membranes, and then allow the patient to lie down again. Keep the presenting part pressed into the brim until a contraction fixes it, or apply a tight abdominal binder with the same object. An extempore Trendelenberg's table can be made by placing an ordinary square kitchen chair on its face along the bed, covering it with pillows in order to protect the patient. By this means the body is alaced on an inclined plane, which is just as efficacious and far more comfortable for the patient than the knee-chest position.

If this method does not succeed, or if the membranes are ruptured, an attempt must be made to replace the cord. This is an extremely difficult operation to perform; as fast as we replace one loop of the cord another comes down. The patient should be placed under an anæsthetic, as any straining renders the operation impossible. Then grasp the cord in the hand, carry it up past the presenting part, and endeavour to hang it over a limb. As the hand is brought down, press the presenting part down into the brim from without.

If the os is not sufficiently dilated to enable the hand to be introduced, or if we fail to replace the cord with the hand, a repositor of some kind may be

used. The best form of repositor is made as follows:—Take a No. 10 or 12 gum-elastic catheter with a stilette. Knot together the ends of a piece of sterilised silk about seven inches in length. Pass any part of the loop thus formed through the eye of the catheter and push the stilette up in such a way that it passes through the loop. The instrument is then ready. To use it, pass

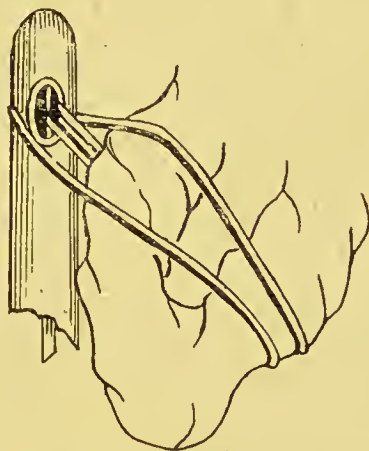


FIG. 55.—Catheter used as a repositor for the cord, showing the manner in which the string is adjusted.

the loop of silk that hangs from the eye of the catheter round the prolapsed portion of the cord, and then throw the loop over the top of the catheter (*v.* Fig. 55). Pass the catheter upwards into the uterus until the cord is above the presenting part, and then withdraw the catheter gradually, at the same time pressing down the presenting part into the brim. So long as the catheter is pushed up, the loop cannot slip off the top of it ; but as soon as we

commence to withdraw it the loop slips off the top, and the cord is set free.

(2) *Podalic Version*.—If reposition fails and the head is presenting, turn the child into a breech presentation, and draw down a foot. By this manœuvre we obtain a presentation which is not so likely to press upon the cord as is a head presentation, inasmuch as the breech does not so completely fill the lower uterine segment. The case must be watched very carefully; and, if the cord stops pulsating, we must extract the child at once if possible. Version is performed by the internal or the bipolar method, according to the size of the os. There is one point in which the method of performing version, in a case of prolapsed cord, differs from the usual method. The child should be turned by pushing the head in the direction of its abdomen, *i. e.* in the reverse of the ordinary direction. The object of this proceeding is to keep the umbilicus of the child as far away from the os uteri as possible, in order to prevent more cord from prolapsing.

(3) *Immediate Delivery*.—If the os is sufficiently dilated podalic version may be followed by immediate delivery.

If version cannot be performed, *i. e.* if the head is fixed, the child must be extracted immediately by the forceps. If the os is sufficiently dilated, there will be no difficulty in the proceeding. If it is not dilated, it must be incised bilaterally, and forceps applied. Never drag the head through an os which is not sufficiently dilated to allow it to pass through without tearing. A laceration will inevitably occur, and a laceration once started may extend into the

lateral fornix and open the uterine artery. If incisions are made, they must be stitched immediately after delivery.

While the necessary preparations are being made for any operation for prolapse of the cord, the patient should be placed on the side at which the cord lies. The reason for this proceeding has been explained (*v.* page 125). Also the patient should be told not to strain or "bear down."

CHAPTER XXXI.

INFANTILE FEEDING.

Breast Feeding—Artificial Feeding—Punctuality—Cleanliness—
Suitable Food—Composition of Cow's and of Human Milk—
Sterilisation of Milk, Pasteurisation—Farinaceous Foods.

THE mother should always suckle her infant herself, unless there is some absolute reason to the contrary. In some cases, either for her own sake or for the sake of the infant, it may be inadvisable for her to do so. She should not nurse her infant, for her own sake, if she is in a debilitated condition owing to previous hæmorrhages, phthisis, or any other wasting disease. She should not nurse the child, for its sake, if she is suffering from any disease which she may communicate to it, as recently acquired syphilis, or phthisis; also if her milk does not agree with the child, or if her breasts are inflamed. Depressed nipples prevent the child from sucking. This difficulty may be overcome by improving the nipples in shape, by drawing them out two or three times a day with clean fingers. If they cannot be improved, a nipple shield may be used, or a *tetarelle*. The latter is an apparatus by the aid of which the mother draws off the milk into a receptacle, from which the child can then suck it. If the mother can be induced to use it intelligently, and if it is kept clean, it is an excellent instrument. But usually these are insuperable difficulties.

If a mother cannot suckle her child, a wet-nurse is the best substitute. However, it is so extremely difficult to obtain a suitable nurse, that bottle feeding is usually to be preferred. The following are the essentials for a wet-nurse :—

(1) She must be perfectly healthy, and free from every disease which might be communicated to the child.

(2) She must be between twenty and thirty-five years of age.

(3) Her breasts must be firm, with well-shaped nipples, and contain abundance of milk.

(4) Her own child must be about the same age as, or slightly older than, the child she is going to nurse, and must be thriving well upon her milk. Also, she must be prepared to give up nursing it.

(5) Her character must be sufficiently good to allow of her being brought into the patient's house.

Artificial feeding has frequently to be resorted to. If it is properly carried out the child will thrive well, but there are many difficulties in the due performing of it.

There are three essentials in feeding an infant,—punctuality, cleanliness, and suitable food.

Punctuality.—The child must be fed at stated times. It must not be fed between these times, and if it is asleep at the hour for its food it must be awakened. For the first month the child is fed every two hours during the day, leaving one interval of four hours at night. From the commencement of the second month the interval between the meals is gradually increased ; until, at the end of the second month, it is being fed every two and a half hours, and at the end of the third month every three hours.

Cleanliness.—If the child is breast-fed, the nipples must be washed with warm water before it is put to them. If the child is bottle-fed, the bottle must be kept absolutely clean. A good bottle should be of the familiar boat shape, *i. e.* it should have no angles. The nipple should fit directly on to the mouth of the bottle, without the intervention of a tube. An excellent bottle is now made with an opening at either end, by means of which it can be thoroughly cleaned out. The bottles should be rinsed out with cold water immediately after feeding the child; then scalded with boiling water; and kept, when not in use, in a solution of soda and water. They must be thoroughly rinsed out in cold water before the milk is put into them. As soon as the child has taken what it wants, the remainder should be poured away.

Suitable Food.—If the child cannot be fed on human milk, then the best substitute is cow's milk in some form. The relative composition of cows' and of human milk is shown in the following table (Starr) :—

| | COW'S MILK. | HUMAN MILK. |
|---------------------------------|--|------------------------|
| Reaction . . . | Faintly acid, due to presence of bacteria. | Alkaline, no bacteria. |
| <i>Specific gravity</i> . . . | 1029 | 1031 |
| <i>Constituents</i> — | | |
| Fats | 3·75 | 4·13 |
| Lactose | 4·42 | 7·00 |
| Albuminoids | 3·76 | 2·00 |
| (Casein and lactalbumin) | | |
| Inorganic matter (Salts, &c.) . | 0·68 | 0·20 |
| Water | 87·39 | 86·67 |
| | <hr/> 100·00 | <hr/> 100·00 |

By referring to this table, we see that cow's milk differs from human milk in that it contains more

casein, less fat, and considerably less sugar. Not only does the quantity of albuminoids differ in the two milks, but also their quality. Cow's milk contains a larger quantity of albumen which is coagulable by an acid; consequently, when it is acted upon by the gastric juice, it tends to form a large firm curd. Human milk under the same conditions curdles in a flocculent mass, and so is more easily digested. We thus see that cow's milk must be considerably modified before it can be made a reliable substitute for human milk. First of all the proportion of casein must be diminished. This is done by adding a certain quantity of water, which of course still further diminishes the proportion of fat and sugar. These must now be increased by adding sugar and fat in some form. Demarara sugar is the best to use, as it counteracts any tendency to constipation on the part of the child. The amount of fat is increased by the addition of cream. If cream cannot be obtained, cod-liver oil may be used instead, or administered separately. Lastly, we must endeavour to cause the cow's milk to curdle in a flocculent mass, otherwise this method of feeding will fail. Barley water, added to the milk instead of plain water, accomplishes this end. It acts in a purely mechanical manner, by running between drops, which then curdle separately instead of in one solid mass.

The constitution of a suitable feeding mixture for a newly-born infant is as follows:—

| | | | | |
|--------------|---|---|---|-------------------------------|
| Milk | . | . | . | One and a half drachms. |
| Cream | . | . | . | One drachm. |
| Sugar | . | . | . | One quarter of a teaspoonful. |
| Barley water | . | . | . | Five drachms. |

The exact amount of barley water to add, and the exact amount of fluid to give the child, can only be found by experiment. On an average, a newly-born infant will take nearly an ounce of the mixture at a time. One part of milk to two parts of barley water is the usual strength to commence with, but, if the mixture is sterilised, equal parts of milk and barley may be used. If the child possits up unchanged milk, it is getting too much fluid. If it passes undigested curds, the milk is too strong. If it digests its food well, but seems always to be hungry, it may get more fluid with proportionately less barley water, or if that disagrees a larger quantity of the usual mixture.

There is still a most important point of difference between artificial food and human milk, *i. e.* that there are always swarms of micro-organisms in cow's milk as we get it. These must be got rid of in some manner. The most obvious method at first sight is to boil the milk. There are, however, great objections to this. It renders the milk less nutritious, and more difficult to digest. Children fed on boiled milk are always constipated. It has been stated, of late, that the nutritive properties of milk are not destroyed unless it is actually boiled; in other words, that any heat short of the boiling-point of milk will not change its properties. The method of sterilising milk recommended by Budin, of Paris, is founded upon this theory. It consists in placing the required amount of milk in a bottle which is three-quarters immersed in water. The latter is raised to boiling-point, at which it is kept for forty minutes. The bottle of milk is

then removed and rapidly cooled. Budin says, further, that if the milk is perfectly sterilised, it does not require to be diluted; in fact, that infants thrive considerably better on undiluted than on diluted milk. My experience is that infants thrive admirably on a mixture of equal parts of barley water and milk prepared as I have described above, and then sterilised for forty minutes in boiling water. I have not found them do so well on the undiluted sterilised milk.

Another method of destroying the germs is by "*Pasteurising*" the milk. This consists in raising it to a temperature between 158° F. and 176° F., and keeping it at this temperature for thirty to forty minutes. This method will destroy the greater number of bacteria and spores, but not all.

Farinaceous foods containing starch should never be given to infants, as the secretions by which starch is digested, *i. e.* the saliva and pancreatic juice, are not fully established until the child is six months old. Condensed milk, and prepared foods in which the starch has been changed into sugar, are sometimes of considerable use during the first two or three months of the child's life, especially if there is a difficulty in obtaining the due sterilisation of the milk. The objection to continuing their use for a longer period as the sole food is that they almost all contain too much carbohydrate, and too little nitrogenous matter. As a result the infants become large and fat, but have not sufficient development of bone and muscle.

CHAPTER XXXII.

SOME INFANTILE DISEASES.

Green Diarrhœa: *Ætiology*, *Symptoms*, *Treatment*—Thrush: *Ætiology*, *Symptoms*, *Treatment*—Ophthalmia Neonatorum: *Ætiology*, *Symptoms*, *Treatment*—Asphyxia Neonatorum: *Varieties*, *Symptoms*, *Treatment*, Schultze's Method of Artificial Respiration—Icterus Neonatorum: *Ætiology*, *Treatment*—Late Hæmorrhage from the Cord. *Treatment*—Cephalhæmatoma.

GREEN DIARRHŒA.

DIARRHŒA, in the infant, consists in the passage of more than six stools in the twenty-four hours. The normal motions of an infant are yellow in colour, liquid in consistency, and slightly faecal in odour.

Ætiology.—Green diarrhœa is due to the entrance of bacteria into the child's stomach. They gain access in the food, most usually in sour milk. The green colour of the stools is due to a pigment which is formed by them in the stomach, or, according to some authorities, to an imperfect oxidation of the bile by which biliverdin is formed.

Symptoms.—The diagnostic symptom is the passage of green motions, and masses of foul-smelling, semi-digested curds. If the case is allowed to remain untreated, gastritis results, which may extend downwards into the intestines. The child then becomes

marasmic, as it is unable to assimilate its food, and dies of starvation.

Treatment.—The prophylactic treatment consists in giving the child milk which is free from germs, and in keeping its bottle perfectly clean. If green diarrhœa occurs, the indication is to clear the curds out of the stomach and intestines. The administration of a teaspoonful of castor oil will usually be found to be sufficient if the case is taken in time. Sometimes, however, this will not suffice, and then more radical measures must be taken. Stop all milk, and feed the child with raw beef juice and barley water (*v. Appendix*). By this means the bacteria are starved out, so to speak, as the majority of them can exist only on milk. This line of treatment, is continued for two or three days. Then, if the diarrhœa has ceased, the child may return to its ordinary diet. If the child is very weak and marasmic, it requires some stimulant. This is best given in the form of white wine whey.

THRUSH, OR STOMATITIS MYCOSA.

This is another disease which results from sour milk. It is the term applied to the formation of small white spots on the mucous membrane of the mouth and tongue.

Ætiology.—It is directly due to the implantation of a fungus, *Oidium albicans* (by some *Saccharomyces albicans*), on the mucous membrane of the mouth. The *Oidium* is found in sour milk; and thus the child may become infected from milk which has decomposed upon the mother's nipple, or in a dirty bottle.

Symptoms.—Small white spots appear on the mucous membrane of the mouth. If untreated, the spots coalesce and form a species of false membrane, which may extend into the pharynx and œsophagus. Green diarrhœa is frequently associated with this condition.

Treatment.—The prophylactic treatment consists in washing the mother's nipples before the child takes the breast; in having the bottle perfectly clean, if the child is bottle-fed; and in carefully wiping the mouth of the child with a soft rag, after it has had its food. If thrush occurs, treat it at once. Wash the inside of the mouth with warm water and a soft rag, and place a teaspoonful of glycerine of borax (B.P.) in the child's mouth, twice a day. This acts as an antiseptic, and destroys the fungus.

OPHTHALMIA NEONATORUM.

Ophthalmia neonatorum is an infectious disease of the eyes, with which the child may become inoculated most frequently during the passage of the head through the vagina, more rarely subsequent to delivery.

Ætiology.—It is almost always due to the entrance of Neisser's gonococcus into the eyes, most usually during the passage of the head through the vagina. It has, however, occasionally been found to have resulted from the entrance of other forms of bacteria.

Symptoms.—Two days after birth, *i. e.* after infection, the symptoms commence. The eyelids become swollen and inflamed, and a purulent discharge flows from between them. In severe cases,

opacities or even ulcers of the cornea may form, and so partial or complete loss of vision result.

Treatment.—Prophylactic treatment should be adopted as a routine in hospitals, also occasionally in private practice, wherever there is any reason to suspect gonorrhœal infection in the mother. It consists in wiping the eyes of the child carefully with a soft rag the moment the head is born, and then in dropping in two drops of a solution of nitrate of silver of a strength of four grains of the nitrate to an ounce of water.

If the infection occurs, our treatment must be more active. The eyes must be well washed with warm water five or six times a day, the lids being separated so as to allow the pus to flow out. At the same time two drops of a two per cent. solution of nitrate of silver is dropped into the eyes once a day; and they must be kept carefully bandaged. The greatest care must be taken to avoid spreading the infection by means of dirty fingers or cloths. If only one eye is infected, the sound eye must be treated with the weaker solution of nitrate of silver. It must also be protected from infection by an hermetic bandage. To do this, apply a small piece of lint spread with boracic ointment to the eye, then a pad of cotton wool, and cover the whole with strips of lint soaked in collodion (Swanzy).

ASPHYXIA NEONATORUM.

Infants are frequently born asphyxiated after protracted labour, or when a malpresentation occurs, especially if it is a breech.

Degrees.—There are two degrees of asphyxia:—

(1) Asphyxia pallida, or white asphyxia.

(2) Asphyxia livida, or blue asphyxia.

The worst form of asphyxia is asphyxia pallida. In it the child is perfectly white when born; the cord is not pulsating; the heart can be barely felt; there are no attempts at respiration; and all reflexes are lost. In asphyxia livida the child is blue; the cord pulsates; the heart beats strongly; there are slight attempts at respiration; and the reflexes are present. In order to feel an infant's heart, press the fingers up under the arch of the ribs, a little to the left of the sternum. It is then easily felt, if it is beating.

Treatment.—To treat an asphyxiated infant successfully, a regular line of action must be laid down and carried out in due order, paying the greatest attention to details. If the child is born in white asphyxia,—

(1) Ligature and divide the cord.

(2) Place the child in a bath of water at 100° F.

(3) While it is in the bath, suck the mucus out of the trachea with a silver or gum-elastic catheter.

(4) Take the child out of the bath, and dry it thoroughly.

(5) Perform Schultze's method of artificial respiration (see below) five or six times.

Repeat steps (2) to (5) over and over again until either the child dies, *i. e.* its heart stops, or until it passes into the stage of asphyxia livida. As soon as this occurs we may assume that its reflexes have returned, and may endeavour to stimulate them. To do this, after taking the child out of the hot bath,

plunge it for a moment into a cold bath; then "Schultze" as before. Continue this routine,—hot bath, extraction of mucus, cold bath, dry, "Schultze," until the child commences to make strong efforts at respiration. Then if there is a fire in the room, make the nurse sit down in front of it, and roll the child on her knees. To do this she places the child across her knees on its side, and then rolls it half over on to its face, at the same time compressing the ribs. This causes expiration. She then rolls it in the opposite direction on to its back; at the same time removing all pressure from the chest, and pulling upon the arm which is uppermost, in such a way as to draw the ribs upwards. This causes inspiration. It is also a good thing to rub whisky on the gums and chest of the child. A child in white asphyxia must not be placed in a cold bath, as it depresses the heart dangerously.

Schultze's method of artificial respiration is performed as follows:—Seize the child in both hands, the thumbs hooked beneath the heads of the humeri, the index fingers along the sides of the thorax, the other three fingers along the back (*v.* Fig. 56). Then raise the child with a quick sweep through the air until its body rolls forward upon your thumbs, which are now placed on the anterior aspect of the chest (*v.* Fig. 57); and at the same time compress the chest laterally with the index fingers and posteriorly with the other fingers, so diminishing its lateral

* This description differs slightly from the original description of Schultze. He recommends to hook the index fingers, and not the thumbs, under the axillæ of the child, thus avoiding the necessity of changing the grip.

and antero-posterior diameters. Owing to the position of the child, the abdominal viscera fall towards the diaphragm, forcing it upwards, and in this way diminish the vertical diameter of the chest. This



FIG. 56.—Schultze's method of performing artificial respiration.
Completion of the inspiratory movement.

movement causes expiration, and the inverted position favours the flow of mucus out of the trachea. Having kept the child for a couple of seconds in this position, it is then swung forwards again into a vertical position. As the child falls forward all

compression is removed from the chest, and the child held by the shoulders; so that, as it falls, its weight causes the ribs to be drawn upwards (*v.* Fig. 56). This movement causes inspiration. The rate of inspiration ought to be from eight to twelve in the minute. It is important to note any attempt at inspiration which the child may make, and to time our movements so as to synchronise with it.



FIG. 57.—Schultze's method of performing artificial respiration.
Expiration.

If the infant is born in a state of asphyxia livida, the cord must not be tied until it has ceased pulsating. It is then tied, and the child treated as described.

ICTERUS NEONATORUM

Icterus neonatorum, or infantile jaundice, occurs as a symptom in three conditions:—

(1) Physiological or simple icterus occurs in a large number of infants. It is said to be due to the destruction of large numbers of red blood-corpuscles after birth, as a result of which a quantity of blood pigment is set free.

(2) Severe or septic icterus occurs in cases of inflammation of Glisson's capsule, the latter being usually due to extension of inflammation from the umbilicus.

(3) Icterus also occurs due to congenital diseases, as syphilis or malformation of the liver.

Treatment.—In simple icterus the child requires no special treatment. A mild laxative, such as glycerine, may be given in order to clear out the digestive tract. In septic icterus the prognosis is very bad. Any septic condition of the umbilicus must be treated with antiseptic compresses or iodoform powder. The child should also be given stimulants.

LATE HÆMORRHAGE FROM THE CORD.

Late or secondary hæmorrhage from the cord may occur at any time during the fortnight subsequent to delivery.

Ætiology.—It may be due to syphilis, hæmophilia, acute fatty degeneration, hæmoglobinuria (Winckel); but the commonest cause is ulceration of the umbilicus due to septic infection.

Treatment.—It is extremely difficult to check, and in most cases fatal. Perchloride of iron, ligature of the entire umbilical ring, plugging of the umbilical fossa with plaster of Paris, and pressure of all kinds have been tried without avail. The method most re-

commended consists in attempting to underpin the umbilical vessels with a stout needle, and then compressing them against the needle by passing a figure-of-eight ligature beneath its projecting ends.

CEPHALHÆMATOMA.

Cephalhæmatoma is the term applied to an extravasation of blood, which sometimes forms, after labour, under the periosteum subjacent to the caput succedaneum. It is due to the rupture of a vessel during delivery. At first it consists of a more or less tense, slightly fluctuating tumour, and is limited in extent by the sutures which surround the bone over which it forms. As the blood coagulates, the periphery of the swelling becomes as hard as bone, while in the centre there is a depression. At this stage it feels exactly as if there were an opening through one of the bones into the skull. It should not be interfered with unless it suppurates, and then it must be opened and drained.



APPENDIX.

THE first of the following tables shows the nature and the proportion of the cases treated in the Rotunda Lying-in Hospital, during the mastership of Dr. W. J. Smyly and the first two years of the mastership of Dr. R. D. Purefoy. The second table shows the number of deaths that have occurred during the same period, and their cause.

TABLE A.—*Showing the Nature of the Cases treated in the Rotunda
Lying-in Hospital.*

| | 1889-90. | 1890-91. | 1891-92. | 1892-93. | 1893-94. | 1894-95. | 1895-96. | 1896-97. | 1897-98. | Total. | Average. |
|--|----------|----------|----------|----------|----------|----------|----------|----------|----------|--------|--------------|
| Total number of labours | 1199 | 1184 | 1219 | 1288 | 1316 | 1267 | 1524 | 1448 | 1513 | 11,958 | |
| Abortions . . . | 29 | 28 | 50 | 41 | 50 | 40 | 44 | 62 | 41 | 395 | 1 in 31·06 |
| Placenta prævia . . | 6 | 5 | 6 | 8 | 7 | 14 | 9 | 4 | 5 | 64 | 1 in 186·84 |
| Accidental hæmorrhage. | 11 | 13 | 20 | 12 | 11 | 5 | 2 | 8 | 6 | 88 | 1 in 135·88 |
| Post-partum hæmorrhage. | 23 | 14 | 11 | 24 | 14 | 18 | 16 | 12 | 17 | 149 | 1 in 80·25 |
| Secondary post-partum hæmorrhage . . . | 3 | 5 | — | 1 | — | — | — | — | 2 | 11 | 1 in 1087·09 |
| Hæmatoma of vulva . . | — | — | — | — | — | — | 2 | — | 3 | 5 | 1 in 2391·60 |
| Hyperæmesis . . . | — | 2 | 1 | 1 | 1 | 1 | — | — | 1 | 7 | 1 in 1708·28 |
| Hydræmnios . . . | 6 | 6 | 5 | 3 | 2 | 3 | 1 | 4 | 11 | 41 | 1 in 291·66 |
| Myxoma chorii . . . | — | — | 4 | — | 1 | 1 | — | 1 | — | 7 | 1 in 1708·28 |
| Eclampsia . . . | 5 | 6 | 6 | 9 | 4 | — | 3 | 1 | 2 | 36 | 1 in 332·16 |
| Insanity { Mania . . . | 3 | — | 2 | 3 | — | — | 3 | 4 | 8 | 23 | 1 in 519·90 |
| { Melancholia . . | — | — | 1 | 1 | — | — | — | 1 | 1 | 4 | 1 in 2989·50 |
| Pelvic presentations . . | 41 | 48 | 29 | 43 | 23 | 49 | 48 | 54 | 62 | 397 | 1 in 30·12 |
| Face presentations . . | 3 | 4 | 3 | 3 | 4 | 6 | — | 3 | 6 | 32 | 1 in 373·68 |
| Cross-births . . . | 3 | 1 | 2 | 3 | 4 | 3 | 4 | 2 | 7 | 29 | 1 in 412·35 |
| Brow presentations . . | 1 | 1 | 2 | 5 | 1 | 2 | 3 | 1 | 3 | 19 | 1 in 624·10 |
| Prolapse of cord . . . | 2 | 8 | 14 | 12 | 6 | 7 | 7 | 8 | 17 | 81 | 1 in 147·62 |

| | | | | | | | | | | |
|--|-----------|------------|------------|-----------|-------------|------------|-------------|-------------|-------------|-----------|
| Induction of premature labour . . . | 2 | 2 | 6 | 3 | 7 | 3 | 3 | 3 | 321 in | 373·68 |
| Adherent placenta . . . | 15 | 10 | 19 | 10 | 10 | 17 | 18 | 18 | 1261 in | 94·90 |
| Version . . . | 8 | 11 | 11 | 14 | 16 | 8 | 11 | 11 | 981 in | 122·02 |
| Forceps . . . | 47 | 22 | 45 | 41 | 32 | 56 | 57 | 57 | 3801 in | 31·46 |
| Craniotomy . . . | 3 | 3 | 1 | — | 1 | 2 | 3 | 3 | 171 in | 70·29 |
| Decapitation . . . | — | — | — | 1 | — | — | — | — | 11 in | 11,958·00 |
| Cæsarean section . . . | — | 2 | — | 1 | — | — | 1 | 1 | 41 in | 2989·50 |
| Post-mortem Cæsarean section . . . | — | — | — | — | — | — | 1 | 1 | 11 in | 11,958·00 |
| Porro's operation . . . | — | 1 | — | 1 | — | — | 1 | 1 | 31 in | 3986·00 |
| Symphysiotomy . . . | — | — | 3 | — | — | — | — | — | 41 in | 2989·50 |
| Rupture of uterus . . . | — | — | — | — | 1 | — | — | — | 31 in | 3986·00 |
| Rupture of cervix and vagina involving Douglas's pouch . . . | — | 2 | — | — | — | — | — | — | 31 in | 3986·00 |
| Morbidity* . . . | 185 | 117 | 60 | 59 | 66 | 78 | 158 | 158 | 8641 in | 13·84 |
| Average morbidity { | 1 in 6·48 | 1 in 10·12 | 1 in 21·46 | 1 in 22·3 | 1 in 18·36 | 1 in 34·63 | 1 in 9·57 | 1 in 13·84 | 1 in 13·84 | |
| Maternal mortality . . . | 19 | 9 | 17 | 7 | 6 | 2 | 6 | 6 | 75 | 159·44 |
| Average maternal mortality { | 1 in 63·1 | 1 in 131·5 | 1 in 75·76 | 1 in 188 | 1 in 211·16 | 1 in 1524 | 1 in 252·16 | 1 in 159·44 | 1 in 159·44 | |
| Percentage maternal mortality . . . | 1·58 | 0·76 | 1·32 | 0·53 | 0·47 | 0·06 | 0·39 | 0·39 | 0·62 | |

* Under the heading Morbidity is included any case in which the temperature rose even once above 100·8° F.

TABLE B.—*Showing Cause of Death in the Rotunda Lying-in Hospital.*

1889-90. TOTAL 19.

| Name. | Admitted. | Delivered. | Died. | Cause of death. | Notes. |
|---------|-----------|------------|----------|------------------------|--|
| C. R. | Nov. 30 | Nov. 30 | Dec. 1 | Eclampsia | Chloral and chloroform treatment. |
| S. C. | Dec. 8 | Dec. 8 | Dec. 8 | Accidental hæmorrhage | Child perforated and extracted. |
| M. C. | Dec. 19 | Dec. 19 | Dec. 19 | Accidental hæmorrhage | Accouchement forcé. |
| T. H. | Dec. 28 | Dec. 28 | Dec. 28 | Phthisis | Admitted moribund. |
| T. K. | Dec. 27 | Jan. 5 | Jan. 10 | Septicæmia | Induction of premature labour by Barnes' bags. |
| J. S. | Jan. 14 | Jan. 14 | Jan. 15 | Eclampsia | Chloral and chloroform treatment and delivery by craniotomy. |
| S. H. | April 8 | April 13 | April 14 | Purulent meningitis | Suffered from influenza previous to admission. Autopsy. |
| M. B. | April 28 | April 30 | May 1 | Eclampsia | Chloral and chloroform treatment. |
| L. F. | May 6 | May 7 | May 23 | Pyæmia | No operation performed. |
| A. F. | June 10 | June 11 | June 22 | Septicæmia | No operation performed. |
| E. C. | June 20 | June 22 | June 25 | Phthisis | Admitted in last stage. |
| A. B. | June 18 | June 19 | July 25 | Septicæmia (?) | No operation performed. |
| E. M. | Aug. 2 | Aug. 2 | Aug. 27 | Pyæmia | No operation performed. |
| M. B. | Aug. 15 | Aug. 17 | Aug. 29 | Septicæmia | No operation performed. |
| S. P. | Aug. 16 | Aug. 23 | Sept. 5 | Septicæmia | P.M.—Large sloughing myoma uteri. |
| M. L. | Aug. 18 | Aug. 20 | Sept. 25 | Pyæmia | No operation performed. |
| M. F. | Oct. 6 | Oct. 7 | Oct. 12 | Septicæmia | Delivery by forceps. |
| B. M. | Oct. 15 | Oct. 15 | Dec. 22 | Pyæmia | No operation performed. |
| C. O'N. | Oct. 24 | Oct. 29 | Oct. 29 | Intestinal obstruction | Suffering from intestinal obstruction for some days previous to admission. |

1890-91. TOTAL 9.

| | | | | | |
|---------|---------|---------|---------|-------------------------------|---|
| M. McG. | Jan. 4 | Jan. 4 | Jan. 9 | Phthisis | Admitted in last stage. |
| M. R. | Jan. 10 | Jan. 10 | Jan. 13 | Pneumonia | Admitted with croupous pneumonia. |
| J. L. | Feb. 1 | Feb. 1 | Feb. 1 | Accidental hæmorrhage | Accouchement forcé. |
| C. M. | Mar. 2 | Mar. 2 | Mar. 2 | Accidental hæmorrhage | Accouchement forcé. |
| E. C. | May 5 | May 5 | May 6 | Epilepsy | History of epilepsy for years. |
| M. F. | Aug. 4 | Aug. 5 | Aug. 6 | Hyperemesis | Vomiting for a month previous to admission. |
| B. B. | Aug. 5 | Aug. 6 | Aug. 9 | Pneumonia | Admitted with symptoms of pneumonia. |
| M. B. | Aug. 6 | Aug. 6 | Aug. 6 | Hæmorrhage, rupture of uterus | Marginal placenta prævia; forceps delivery; died on couch. |
| C. K. | Oct. 2 | Oct. 3 | Oct. 3 | Rupture of uterus | Long-standing case of prolapse of cervix; uterus ruptured 6 hours after labour commenced. |

1891-2. TOTAL 9.

| | | | | | |
|-------|----------|----------|----------|------------------------------|--|
| A. P. | Nov. 3 | Nov. 4 | Nov. 4 | Eclampsia | Chloral and chloroform treatment. |
| M. S. | Nov. 18 | Nov. 20 | Nov. 29 | Mania | Unmarried. Temperature remained normal until 30 minutes before death, then rose to 109-4° F. Admitted in last stage. |
| B. C. | April 8 | April 9 | April 9 | Mitral disease | Chloral and chloroform treatment. |
| M. M. | April 14 | April 14 | April 15 | Emphyema | Admitted with croupous pneumonia. |
| C. A. | June 14 | June 14 | June 15 | Eclampsia | Admitted with rupture; Porro's operation performed, but it failed to check hæmorrhage. |
| A. C. | June 23 | June 24 | June 26 | Double pneumonia | Admitted with broncho-pneumonia. |
| M. R. | June 29 | June 30 | June 30 | Rupture of cervix and vagina | Admitted with broncho-pneumonia. |
| M. B. | July 6 | July 6 | July 7 | Pneumonia | Chloral and chloroform treatment. |
| M. B. | Oct. 27 | Oct. 27 | Oct. 28 | Eclampsia | Chloral and chloroform treatment. |

1892-3. TOTAL 17.

| Name. | Admitted. | Delivered. | Died. | Cause of death. | Notes. |
|--|---|---|--|--|--|
| M. M. M'C. | Dec. 17 Dec. 17 | Dec. 18 Dec. 18 | Dec. 18 Dec. 18 | Eclampsia Ruptured cervix | Culoral and chloroform treatment. Admitted with ruptured cervix owing to unskilled use of forceps outside. Died of hæmorrhage. |
| M. N. M. A. H. M. M. D. M. F. | Jan. 1 Mar. 9 April 7 April 2 | Jan. 27 Mar. 10 April 7 April 3 | Jan. 27 Mar. 10 April 8 April 21 | Eclampsia Phtisis Septicæmia Pulmonary embolism | Chloral and chloroform treatment. Admitted in last stage. Admitted in advanced stage of sepsis. Occurred 18 days after delivery, subsequent to phlebo-thrombosis in leg. |
| M. H. M. P. M. M. C. L. C. | May 31 June 19 June 24 June 25 | May 31 June 19 June 28 June 25 | June 1 June 19 July 1 July 14 | Post-partum hæmorrhage Mitral stenosis Cerebro-spinal meningitis Pyæmia | Myomatous uterus. Admitted in last stage. Ill before admission. Ruptured symphysis during labour, and an abscess formed between the bones. Uterus normal. Vagina plugged until labour set in, then accouchement forcé. |
| C. B. M. O'C. | July 18 July 24 | July 18 July 24 | July 18 July 29 | Accidental hæmorrhage Sepsis | Admitted with ruptured cervix due to improper use of forceps; also septic. |
| M. A. R. K. L. S. W. K. D. | Aug. 31 Sept. 24 Sept. 25 Sept. 30 | Undelivered Sept. 24 Sept. 25 Sept. 30 | Sept. 9 Sept. 26 Oct. 20 Sept. 30 | Uræmia Peritonitis Mania Accidental hæmorrhage | Admitted septic. Admitted with the vagina plugged, though membranes were ruptured; perforation followed by extraction; died on couch. Child delivered by symphysiotomy; wound sloughed. |
| L. M'G. | Oct. 29 | Oct. 29 | Nov. 9 | Supraemia | |

1893-4. TOTAL 7.

| | | | | | |
|-------|---------|------------------|---------|--|---|
| M. D. | Nov. 13 | Nov. 15 | Nov. 20 | Uramia Septicæmia Eclampsia (?) Syncope Hyperremesis Septicæmia Cæsarean section | Child putrid; physometra. Morphia treatment. Patient delivered by forceps; no hæmorrhage; died suddenly. P.M.—All organs healthy; no laceration of uterus or vagina. Died of exhaustion. Plugged outside for accidental hæmorrhage. Died of ruptured intestine, which was injured during operation. |
| K. C. | Dec. 20 | Dec. 29 | Jan. 5 | | |
| E. D. | Feb. 19 | Feb. 19 | Feb. 24 | | |
| M. K. | Aug. 18 | Aug. 18 | Aug. 19 | | |
| K. K. | Aug. 15 | Aug. 16 | Aug. 19 | | |
| E. H. | Oct. 1 | Unde- livered | Oct. 6 | | |
| J. S. | Oct. 28 | Oct. 28 | Oct. 30 | | |

1894-5. TOTAL 6.

| | | | | | |
|-------|---------|------------------|---------|-----------------------------------|---|
| A. C. | Dec. 13 | Dec. 11 | Dec. 27 | Pyæmia Eclampsia Nephritis. | Admitted with incomplete abortion, and septic. Morphia treatment. |
| M. H. | Dec. 23 | Dec. 23 | Dec. 25 | | |
| E. L. | Feb. 9 | Unde- livered | Feb. 9 | | |
| C. H. | June 25 | July 1 | July 2 | Bright's disease Heart disease | Hyperremesis for 6 weeks before admission. Died undelivered and not in labour. |
| E. D. | Aug. 31 | Unde- livered | Sept. 9 | | |
| M. B. | Oct. 11 | Unde- livered | Oct. 13 | Bright's disease | Died undelivered and not in labour. |

1895-6. TOTAL 1.

| | | | | | |
|-------|--------|---------|---------|------------|----------------------------|
| M. D. | Feb. 7 | Feb. 16 | Feb. 25 | Septicæmia | Labour induced by bougies. |
|-------|--------|---------|---------|------------|----------------------------|

1896-7. TOTAL 2.

| Name. | Admitted. | Delivered. | Died. | Cause of death. | Notes. |
|---------|-----------|------------|---------|-------------------------------|--|
| A. M'D. | Dec. 23 | Dec. 28 | Dec. 31 | Rupture of uterus and bladder | Contracted pelvis; 6-para, 4 children born dead, 5th alive. Breech presentation, head allowed to mould, transverse rupture of bladder and a second rupture by attrition involving bladder and lower uterine segment. |
| L. D. | Feb. 8 | Feb. 8 | Feb. 21 | Septic endometritis | Admitted with ulcers on legs, and extensive sloughing ulceration of labia majora; no vaginal examinations were made. |

1897-8. TOTAL 6.

| | | | | | |
|---------|---------|---------|---------|------------------------------|---|
| E. O'D. | Dec. 20 | Dec. 21 | Dec. 23 | Cardiac disease | Admitted in last stage. |
| B. K. | Mar. 7 | Mar. 7 | Mar. 8 | Chronic nephritis | Admitted in last stage. |
| A. M. | Mar. 26 | Mar. 27 | Mar. 28 | Hyperemesis | Admitted in last stage. |
| K. B. | June 3 | June 4 | June 18 | Puerperal mania | Died suddenly on fifth day of mania with brain symptoms. No P.M. |
| J. D. | June 11 | June 11 | June 11 | Acute suppurative meningitis | Admitted in a comatose condition, delivered by post-mortem Casarean section; child asphyxiated, could not be revived. |
| M. C. | Oct. 4 | Oct. 5 | Oct. 23 | Pycemia | Casarean section, contracted pelvis. |

RECIPES FOR INFANT FEEDING.

Beef Juice.

To prepare beef juice, take four ounces of lean beef, cut it up into small pieces, and place it in a jar with four ounces of cold water. Let the whole stand in a cool place for two and a half hours, then strain the mixture. Give the infant one part of the juice, thus obtained, diluted with two parts of barley water. To avoid decomposition and the formation of ptomaines, the beef juice must be kept in a cool place, and prepared fresh for each meal.

Barley Water.

Add two teaspoonfuls of well-washed pearl barley to a pint of cold water. Boil the mixture until it is reduced to three-quarters of a pint.

Humanised Milk.

| | | |
|----------------|---|-------------------------------|
| Pure new milk | . | Three and a half drachms. |
| Cream | . | One drachm. |
| Demerara sugar | . | One quarter of a teaspoonful. |
| Barley water | . | Four and a half drachms. |

Pour the mixture into a bottle, the neck of which is then plugged with cotton wool. Place it in a saucepan of warm water over a fire or gas stove, and allow it to remain there for forty minutes after the water has commenced to boil. Then remove the bottle, and cool rapidly.

White Wine Whey.

Add two ounces of sherry to half a pint of pure new milk, which has been heated to boiling-point. Bring the milk again to the boil for a moment. The mixture curdles, and the whey is separated by straining through muslin. The infant may be given up to half an ounce of the whey at a time.

Lime Water.

Add a lump of unslaked lime to a pint of water. Mix it thoroughly, and then allow the mixture to stand for a couple of hours. As soon as the excess of lime has fallen to the bottom of the vessel, pour, or syphon off, the clear fluid.

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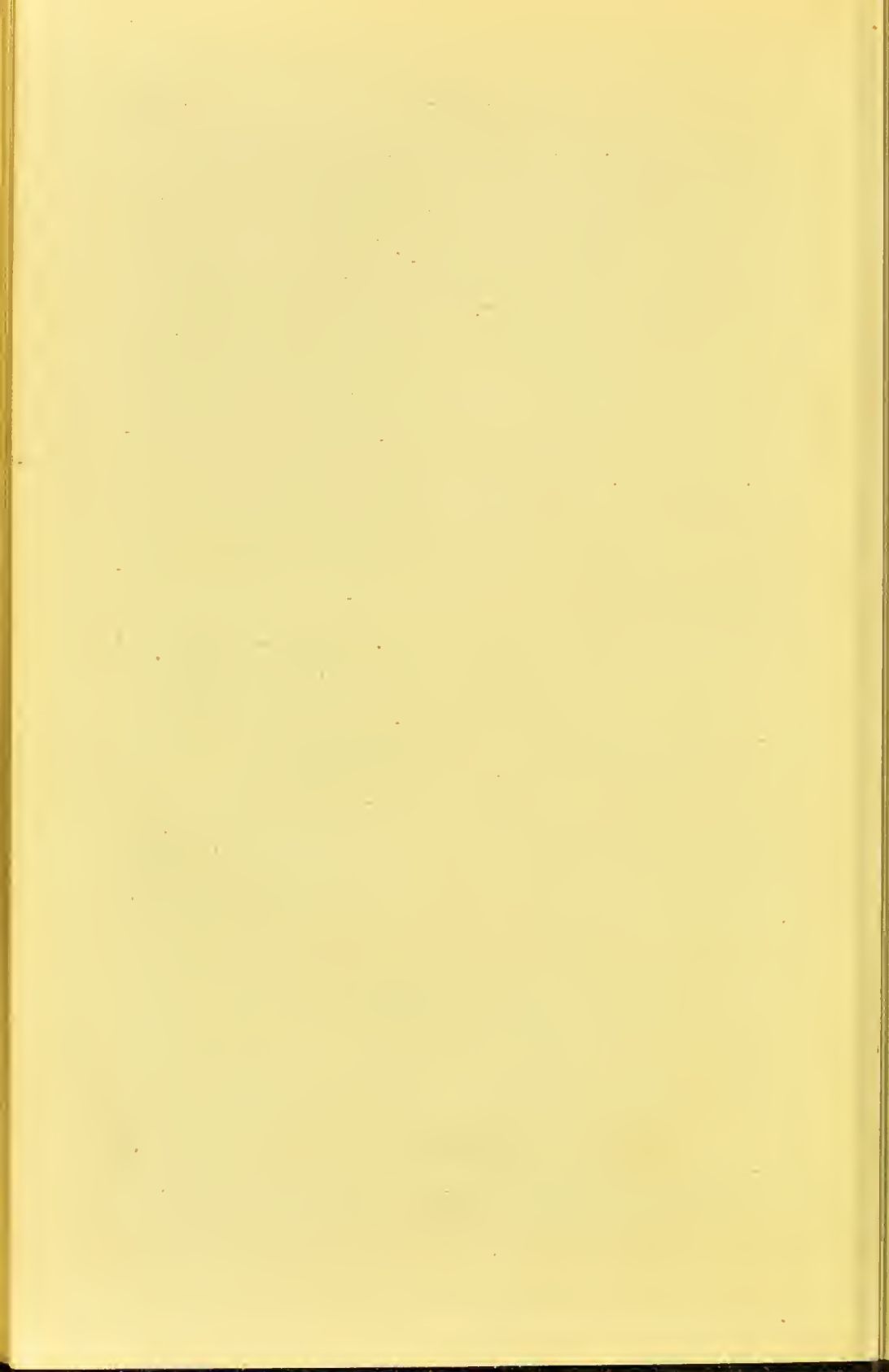
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